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WRITTEN SO YOU CAN UNDERSTAND IT

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## Remarkable Safety Goggle for Flying Men

OF much interest and considerable importance in the aeronautic world is the invention of a distinctly new type of safety goggle that possesses remarkable qualities of great advantage to airmen.

One of the outstanding features is that each of the two lenses is formed of one optically plane piece of glass which has no distorting or prismatic effect. Furthermore the position of the lenses and their shape give a visual angle of 170°. These two points are of inestimable value to a flier, especially when landing and in scouting.

Each lens is backed by a transparent shield made of a secret material that has great strength and resilience. The former is only .081 in. thick and the latter .021 in. Between the two is an air space. Here lies the spectacular phase of the invention. While the goggle is being worn, either of the lenses may be struck a heavy blow with a wrench or cold chisel. The lens may be shattered, but the inner shield not only prevents the particles of glass from reaching the eye, but in rebounding hurls them outward and also stops the progress of the instrument. In this connection it is interesting to note that the shield has a

This Unquestionably Is the Most Spectacular and Convincing Test of a Safety Goggle That could be Made. The Lens is Shattered, but the Protective Shield Screens the Eye

No Glass Enters the Demonstrator's Right Eye. The Protective Shield Prevents the Splinters from Passing through the Goggle and Throws Them Outward

The Lens is Held in the Frame by the Locking Spring Here Illustrated. The Lugs Fit into Recesses in the Frame, and in Case of Breakage, a New Lens can be Easily Inserted by Removing the Spring with the Point of a Knife. The Arrangement Is Much the Same as on Motor-Car Wheels

tensile strength of from 8,000 to 12,000 lb. to the square inch. The air space between the lens and the shield prevents the clouding of the glass at high altitudes.

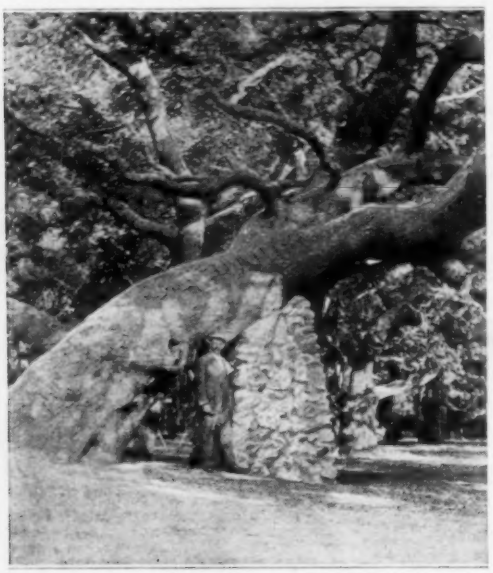
The lenses are mounted in angular positions in holders and made fast by spring locks similar in principle to those used on motor-car wheels. This arrangement makes the goggle streamline, so that air resistance is reduced and rain drops are prevented from accumulating on the outer surface. Ventilation is obtained through adjustable openings provided at the top and bottom of each eye compartment. The air enters in such a manner that no direct current can strike either of the eyes. Furthermore, the edges of the goggle are beveled, shaped to fit the face, and trimmed with fur so that air cannot enter except through the ports.

Shocks and jolts received in landing frequently throw a pilot against the cowl of his machine and on many occasions have resulted thereby in broken goggles. For this and other apparent reasons, an ordinary goggle is dangerous.

Other nonbreakable goggle lenses, consisting of alternate layers of glass, cement, and celluloid, have been made. Obviously, however, such a combination not only keeps out much light, but may have a distorting effect. The value of the new goggle therefore must be patent even to a layman.

## STONE PIER KEEPS BIG OAK FROM FALLING

In a beautiful park in Orange County, Calif., special precautions have been taken to preserve an immense live oak which was threatened with destruction by falling. The tree, with branches having a spread of fully 125 ft., leans far to one side, and because of its great weight was likely to



**Huge Live Oak in Orange County, California Park, Which is Kept from Falling by a Stone Pier Built under the Inclined Trunk**

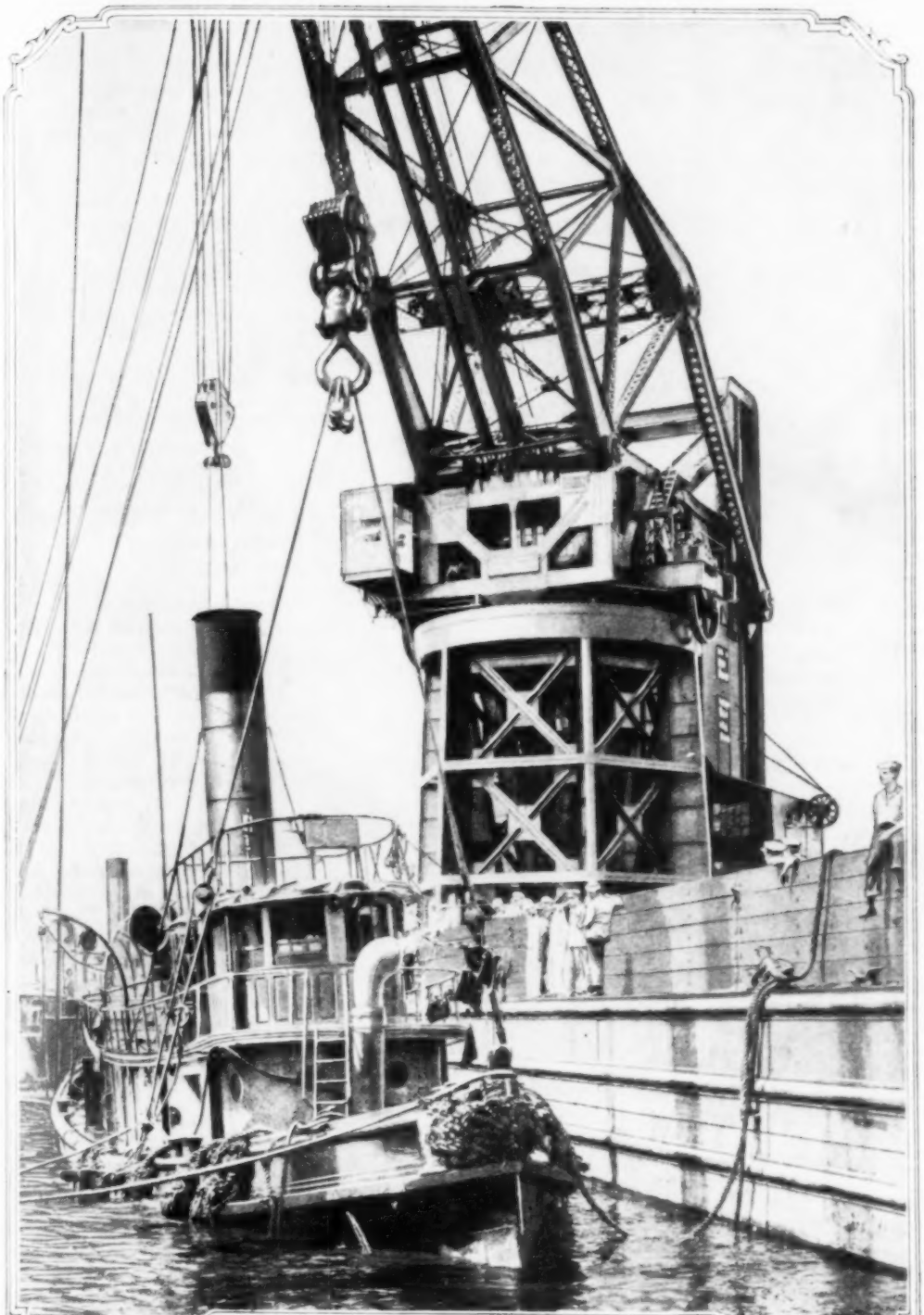
be uprooted until the park authorities built a strong pier of masonry to support the inclined trunk. Upheld by the pier, the tree promises to continue to thrive for many years. The support is about 7 ft. high and nearly as broad at the base.

## MINIATURE EDITION IN PAPER HAS NEWS FOR SOLDIERS

A Denver daily paper has been furnishing its readers with an original and attractive means of supplying news items to friends and relatives overseas. In each issue a space about four inches square is set aside as a miniature overseas edition of the paper, with its own date line, volume, number, etc. Here are printed brevities which give the reader a summary of the day's most interesting happenings, at a glance. It is intended that this section be cut out and inclosed with letters sent to men in the service.

## BIG FLOATING CRANE RAISES TUG FROM HARBOR BOTTOM

One of the tasks recently assigned to a giant floating crane that bears the reputation of being the largest of its kind in the country, was the raising of the navy tug "Massasoit," which sank in one of our harbors not long ago. The feat, of little importance in itself, illustrates most strikingly the capacity of the crane, which is mounted on a pontoon, 140 ft. long and 85 ft. wide. Cables were passed beneath the hull of the sunken vessel by divers and then attached to the hoist hooks. With almost as much ease as if it had been raising a foundered rowboat, the crane lifted the heavy submerged tug from the harbor. Incidentally it is interesting to note that when the crane's jib is raised to its full height, it reaches a point 200 ft. above the level of the water. The crane is driven electrically by current generated aboard, and is controlled by one man. It automatically locks if the current is interrupted.

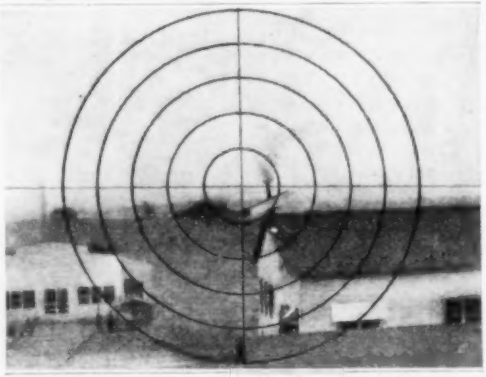


**After Divers had Placed Stanch Steel Ropes beneath the Sunken Tug, the Powerful Crane Lifted the Boat from the Harbor Bottom without Apparent Effort. The Photograph Shows the Dripping Vessel Held at the Surface in Its Cable Sling, Ready for the Water to be Pumped from Its Hull**

## CAMERA GUN CATCHES BIPLANE IN DREADED TAIL SPIN

Two things about which questions are often asked by those interested in, but unfamiliar with, military aeronautics, are the famous tail spin—the cause of many fatalities—and the ring-sight camera gun used in training aerial fighters. Quite singularly, both of these subjects are treated in one of the illustrations herewith. The picture, taken with a camera gun, shows a training plane falling in a tail spin, or, more correctly, out of one. It ended in a crash that seriously injured, although it did not kill, the pilot. The machine was serving as a target for a student gunner stationed on the roof of a hangar, when, swerving to avoid a water tank, it slipped into a tail spin. The gunner shifted his sight to take a direct picture, rather than to register a hit, and caught the craft just before it took its final plunge. Had the exposure been made an instant sooner it would have shown the plane side to and nosed down at an angle of about 60°. It also would have been to the left and slightly above the position in which it is shown. The photograph pictures the tail of the machine in an almost vertical position. In a tail spin proper, however, the nose descends in a very tight, steep spiral, while the tail whips about in a wide circle, thus presenting an appearance somewhat like that of a maple seed falling through the air. The targetlike rings and bisection lines visible in the picture are produced by a screen in the camera gun and are for the purpose of checking hits. In this particular case, to have registered a hit, the plane should be shown entering the outer circle at the top, with its axis cutting the intersection of the two straight lines. The position of the image in relation to the rings indicates the gunner's judgment in "leading" his target.

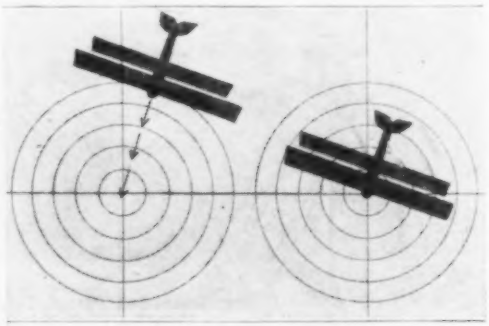
**The Camera Gun, Shown in Use Above, Enables a Student in Aerial Gunnery to Practice Firing at Speeding Aeroplanes. The Instrument, Instead of Hurling Bullets, Takes Pictures That Check the Gunner's Marksmanship**



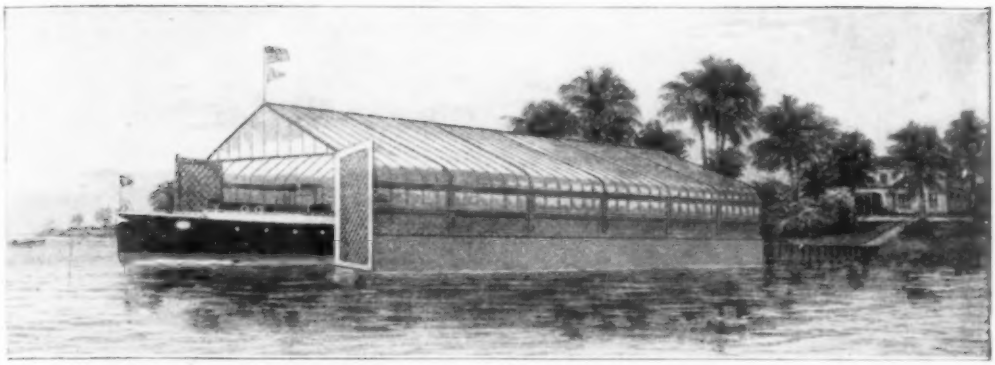
**Within the Center Ring Is the Image of the Falling Aeroplane. The Craft is Taking Its Final Plunge after Slipping into the Fatal Tail Spin. The Picture does Not Register a Hit**

## COKE CAN BE MADE FROM COAL FORMERLY THOUGHT UNFIT

At a recent meeting of French scientists it was pointed out that coke could be produced from kinds of coal which hitherto has been considered unsuited for such use. As a rule, coke is made by mixing two kinds of coal, one rather poor in volatile matters and the other over-rich. Now the claim is made that coal too rich in volatile matters to be useful in making coke can be utilized for that purpose if a pro-



**The Picture at the Left Registers a Hit, and the One at the Right a Miss. This Is Due to the Facts That a Gunner must "Lead" His Target, and That Speed, Direction, and Foreshortening must be Considered**



**Glass Boathouses Are Sufficiently Unusual to be Termed Rare. Anyway, This One, being Built at Miami, Florida, has Attracted Considerable Local Comment**

portion of the volatile substances is first removed by subjecting it to predistillation at a certain temperature.

## IRELAND'S COAL AND LIGNITE FIELDS TO BE EXPLOITED

Great Britain's fuel shortage has caused attention to be directed to certain of the potential coal resources of Ireland with a view to their immediate commercial exploitation. Operations are about to be commenced in County Tyrone and borings will be made at Coalisland and in the district between there and Lough Neagh. It is said that some of the Coalisland seams are known to be of good quality, but the present operations in the country along the way to Lough Neagh are to be for the purpose of determining the existence of coal in paying quantities. Lignite abounds in the region and its utilization is to be undertaken at once. It is to be stripped from its bed by rotary cutters, processed, and pressed into briquettes. The secret treatment to be employed is said to make lignite a good coal substitute. The machinery now being installed will be capable of producing perhaps 15,000 tons of briquettes weekly.

## GLASS BOATHOUSE IS DESIGNED FOR NEW YORKER'S YACHT

Lace curtains, wall decorations, and phonographs are among the properties classed as essential for well-equipped modern cow sheds, but an aquatic conservatory for a full-grown yacht is quite another thing. Such a structure, however, is being built adjacent to a New Yorker's winter home at Miami, Fla. It is constructed throughout of steel and glass and rests on a concrete foundation. Lattice doors at the ends assure proper ventilation, while the abundant light admitted largely obviates the chances of mildew forming. In designing the glass boathouse, the architects attempted, while providing a shelter, to approximate conditions that obtain when a boat normally rides at anchor.

## CREPE ON SEMAPHORE HONORS DEAD TRAFFIC OFFICER

The hanging of crêpe and a spray of flowers on a crossing semaphore in Portland, Ore., was the unusual means employed by members of the police force to pay respect to one of their number, who before his death operated this signal. Out of regard for the man who died, traffic paused an instant as it came to the street intersection where the crêpe hung.

**Traffic Semaphore in Portland, Oregon, Hung with Crêpe Out of Respect for the Police Officer, Formerly Stationed at This Crossing, Who had Died**

FROM INTERNATIONAL FILM SERVICE

**Submarine against Submarine in the North Sea has been a Gambling Game with Greater Odds against the Waters Where, until the Conclusion of Hostilities, They**

# UNSUNG HEROES

## VII—The Submarine Fighter

By E. T. BRONSDON

The text of this article and the photographs have been passed by the Chief Military Censor.

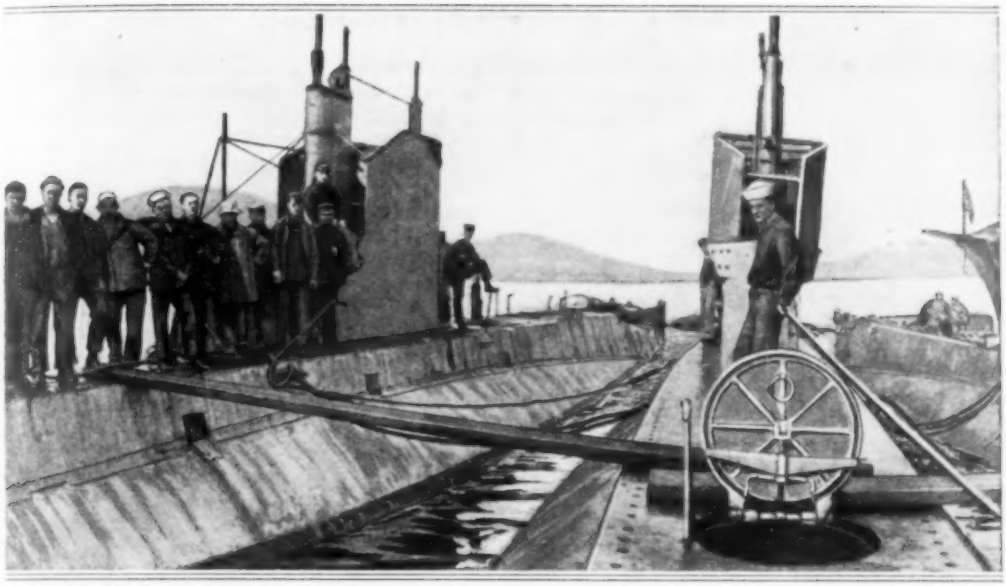
"AT 4:12 p. m., sighted a small cargo carrier near lightship. Shortly after we passed her, sounds of shelling attracted our attention. A German submarine had engaged her. While sending wireless calls for help, the gunner of the cargo ship was replying energetically. We crept up unobserved to 600-yd. range, and released the bow torpedo. This struck the German submarine amidships, and she sank. Wreckage was scattered over a large radius."

This laconic report was a summary of the first naval encounter between the Hun sea pirates and the United States submarine flotilla in foreign waters. In the six months following, at least 14 more of the enemy were accounted for; this is the conservative estimate, based on over 40 successful sea duels in which the enemy was known to have been damaged.

On paper, in the terse official language, this sort of success is robbed of its high dramatic quality. We can picture easily the slim, graceful destroyer, plowing through the rollers like the torpedo it fires—or dodges. We can see the chase. At 30 knots or better, the white foam curling over her bow like whiskers over the chin of a Mormon patriarch, the destroyer plunges at the spot where a U-boat was seen to submerge. As she passes, daring the torpedo certainly aimed to head her off, she drops depth charges from the stern. White geysers rise behind her. Perhaps she got her quarry; one rarely knows. The point is that we can visualize this engagement. The dangers are very real. On the other hand, we see one submarine rise suddenly from the depths, discharge a torpedo or two at another submarine, and then sink out of sight again. There is nothing spectacular—unless one of the torpedoes finds its mark.

The answer to this is simple. Up to the signing of the armistice all the young men to whom adventure in its most hazardous form appeals overwhelmingly, were applying for the submarine service. Until the government put a stop to it, applications for transfer from the destroyer to the submarine service flooded the navy department. After the pioneers had shown what could be accomplished, chasing Fritz around the North Sea became one of the most popular of the grim war sports.

For it is a sport; submarine versus submarine in the North Sea is a gambling game, with greater odds against the player than he faces in roulette, faro, or even fan-tan in a Chinese joint. Davy Jones is "house," and this cynical proprietor demands a percentage that would have made the crookedest booky of the old days blush for shame. For the crew of the submarine, victory means escape



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**Player Than He Faces in Roulette. The Picture Above Gives a Glimpse of American Submarines in British Sought German U-Boats, and on Occasions Sank Them**

with a whole skin, and perhaps a ribbon or medal to show for a hard-won success. The forfeit, in case of accident or defeat, is a watery grave and oblivion for all hands. "Cushy" wounds and Blighty are not for them; they either win, or lose all.

The reason for this lies in the fact that many dangers menace a submarine besides the craft it is seeking. New mine fields are planted daily by the Hun "egg layers"—submarines equipped to drop five huge mines through circular wells in the floor. Old and well-known mine fields are breaking up daily, scattering their diabolical, destructive machines throughout supposedly safe waters. In addition to these perils, there is the omnipresent German "dud" torpedo—the missile that has gone wide of its mark, and which floats, when its propelling force is expended, either on the surface or just below. Civilized countries manufacture their torpedoes so that they sink if they miss, and thus constitute no menace to innocent shipping. Not so with Fritz's "perfectos," however. With him every ship is an enemy ship, so he allows his torpedoes to stay where they will have the best chance of doing damage later. German U-boats released upward of 600 torpedoes a week in the North Sea and adjacent waters, and as less than one in ten finds a mark, it can be seen how real this menace was.

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**Deck View of an American Submarine, Surface-Cruising on Patrol Duty in the North Sea: The Hazards Taken by These Craft for the Slim Chance of Bagging a U-Boat were Inspiring**

Even this is not a full catalog of the perils faced by the intrepid undersea fighters. Nothing much is made of the incessant cold which pervades every submarine—the temperature of the ocean depths is rarely much over 40° F., and in winter even lower. Because there is no room in a submarine for men

to exercise, the death rate from pneumonia and kindred troubles is high.

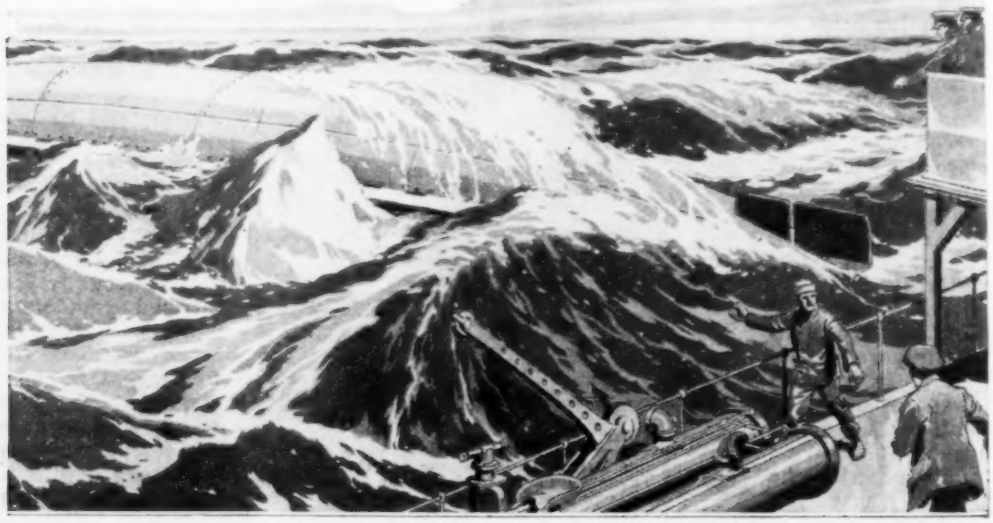
Last winter an odd accident accounted for the whole crew of one German submarine. The boat was found floating upside down! When towed in and righted it was found that the conning tower, hatch, and platform had become incased in a block of ice so thick that it evidently had overweighted the U-boat in a heavy sea. The crew, suddenly finding themselves upside down, had probably been unable to break through this ice in order to open the hatch, before they had been suffocated by chlorine. As the U-boat itself was unharmed, it was immediately put into service in the British navy.

Another risky part of the business is involved in the matter of identification. In the North Sea there were perhaps five German submarines for each one of the allied boats chasing them. Every allied destroyer operated under instructions to "shoot first and ask questions afterward." Because when attempting to stalk another submarine it is necessary to have as little showing above the surface of the water as possible, no allied undersea fighter carried an ensign on these occasions. As a result, it quite often happened that a British, French, or American destroyer made a swift attack on a friendly submarine.

All the latter can do is "duck and hope for the best," unless the attack has been perceived some time in advance. If 15-ft. depth is attained, the attempted ram is avoided, but this is just the beginning. Then come the depth charges and the wire drags. Because of serious accidents of this kind in the British navy, where boats were damaged or sunk by friendly destroyers before identity could be established, a new torpedo-buoy apparatus has been invented. The mechanism is simply a bobber buoy, shaped like an ordinary torpedo, and carrying an ensign that unfolds when the surface is reached. When a submarine is compelled to seek the depths to get out of the way of a friend, one or two of these buoys are immediately shot through the torpedo tubes. Because the crew of the destroyer is intently watching the surface of the water at this time, the boat below is given a chance to rise.

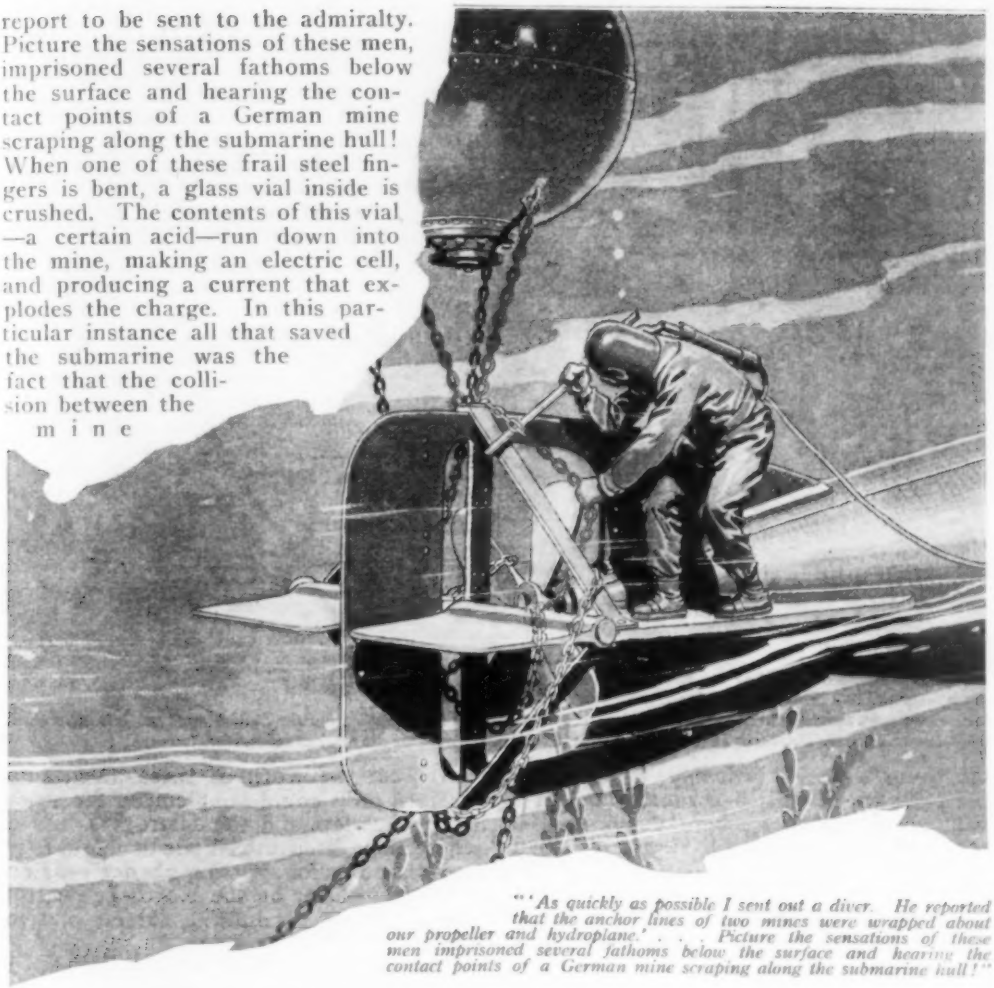
The sensations incident to running into an unexpected mine field while in pursuit of the enemy are told succinctly by the report of a British submarine commander. "While running submerged we felt a succession of light taps on the steel. Then our propeller tangled and the hydroplane could not be moved. I gave the signal to stop instantly, but in the next second I heard the scraping of some metallic object along the side. It could be only one thing, and while we sat waiting for that mine to explode all of us trembled. As quickly as possible I sent out a diver. He reported that the anchor lines of two mines were wrapped about our propeller and hydroplane. In 15 minutes we were free."

"All of us trembled!" It must be borne in mind that this was an official



*"The boat was found floating upside down! When towed in and righted it was found that the conning tower, hatch, and platform had become incased in a block of ice so thick that it evidently had overweighted the U-boat in a heavy sea."*

report to be sent to the admiralty. Picture the sensations of these men, imprisoned several fathoms below the surface and hearing the contact points of a German mine scraping along the submarine hull! When one of these frail steel fingers is bent, a glass vial inside is crushed. The contents of this vial —a certain acid—run down into the mine, making an electric cell, and producing a current that explodes the charge. In this particular instance all that saved the submarine was the fact that the collision between the mine



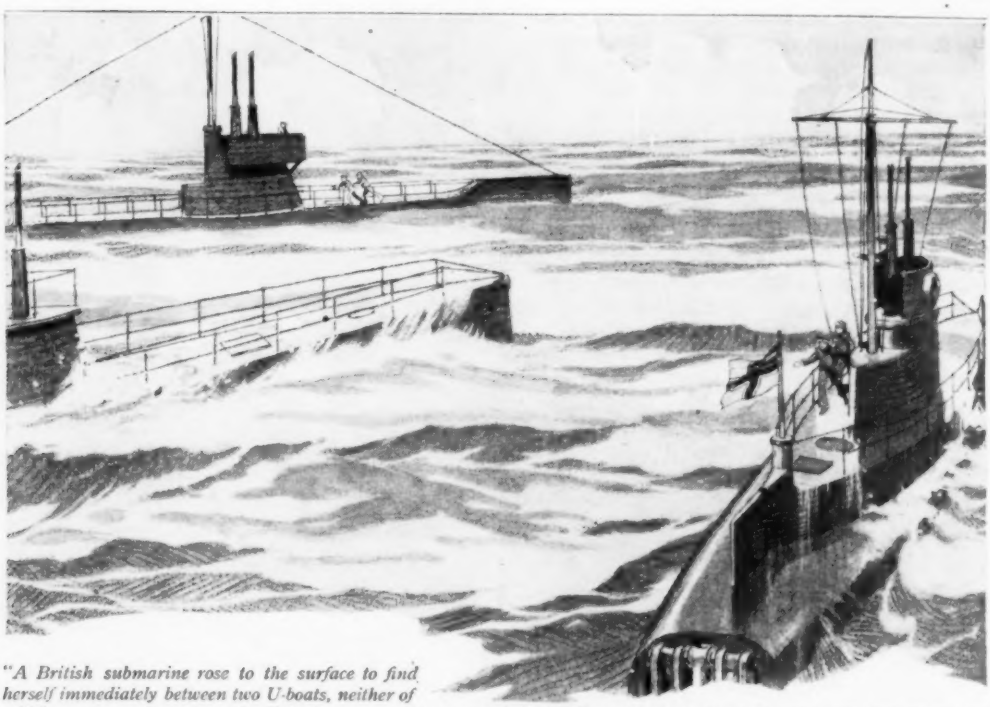
*"'As quickly as possible I sent out a diver. He reported that the anchor lines of two mines were wrapped about our propeller and hydroplane.' . . . Picture the sensations of these men imprisoned several fathoms below the surface and hearing the contact points of a German mine scraping along the submarine hull!"*

and the side of the ship had been so gentle that none of the contact fingers had been broken.

Actual combats between undersea foes are usually unexpected, sharp, and decisive. Of course, an incident like the first-mentioned in which a German submarine is surprised while actively engaged, happens occasionally, but the bulk of the conflicts occur at places and at moments hard to foresee. Dozens of spats have taken place at ranges so short that for a time neither combatant dared to use torpedoes, as an explosion so near at hand must certainly shatter both vessels.

On one occasion a British submarine rose to the surface to find herself immediately between two U-boats, neither of which was more than 40 yd. distant. The German craft were awash, and several of the crew of each were out, exchanging gossip and gulping in the fresh air, which to men who have been shut up for many hours while their craft threaded the perilous passage from the German base, is the greatest luxury in the world. It was a surprise to all parties, but the British craft got into action first. Wheeling in as sharp a circle as she could manage, she trained her guns on the farthest submarine. The Germans vanished below as if by magic, and both enemy craft started to submerge. Two shells were seen to make direct hits, however, on one of the U-boats.

No time for examination was given, though. While the second U-boat was going down it launched a pair of torpedoes from the bow. Both of these missed by a narrow margin, and it was doubtless lucky for all concerned that they did, else



*"A British submarine rose to the surface to find herself immediately between two U-boats, neither of which was more than 40 yards distant. . . . It was a surprise to all parties, but the British craft got into action first. Wheeling in as sharp a circle as she could manage, she trained her guns on the farthest submarine."*

all three fighters probably would have been sunk. The British submarine, after completing its circle, bore down on the spot where the second Hun craft had been just a few seconds previously. The intention was to ram—a desperate expedient that as often as not sends both attacker and attacked to the bottom, locked together in a death grip.

As luck would have it this time, however, the Hun attained sufficient depth to escape. Immediately, then, the British craft submerged also, seeking cover. Then ensued a game of hide and seek that lasted two full hours, and which exhausted the entire stock of torpedoes carried by the British craft. Most of these missiles were released "on suspicion"—directed at a mark thought to be seen, but which was not certain. All missed, but afterward, while cruising about, the sea contained great blobs of oil, presumably from the first U-boat that had been attacked by shell fire. Because German submarines in tight positions were in the habit of releasing great quantities of oil like this as protective camouflage—the idea being to convince the pursuer of his success, and thus win a chance to escape—the British craft let go her depth charges before departing for the home port.

At best the work of these allied submarines only could supplement the work of the trawlers and the destroyers. Even where they discovered Fritz at work, they had only a "slim sporting chance"—as an American officer on the North Sea patrol phrased it—of accounting for his elusive craft.

The important thing is, however, that some submarines have been sunk in this way, and at a time when every straw flung on the scales counted heavily. Next to this what mattered most was the fact that Fritz never had a moment on the surface of the sea in which he felt perfectly safe. The motor of a seaplane warns, a trawler or destroyer can be seen at a great distance, but the hostile periscope may steal up behind any wave. The effect of this strange warfare upon the morale of German submarine crews was bad in the extreme.

And the men who spend their hours down under the chilly sea, searching for the piratical foe? The navy scoffs no longer; this is a respected service, and one which demands the utmost in manhood and daring. Though he may not be a "civvy hero," the submarine fighter has won for himself a niche in our hall of fame.

## NEW COAL DEPOSITS FOUND NEAR LYON, FRANCE

The fact that in normal times France consumes approximately one-third more coal than it produces—or a total consumption of 66,000,000 tons—has led various interests to make search for additional coal fields in the republic. Several surveys which gave promise of success were interrupted by the war. However, investigations in the Rhône basin, in the vicinity of Lyon, have been in progress for some time, and reports regarding the same have been recently made public. It has been found that there are three thin layers of coal about 1,000 ft. below the surface, each layer being less than 3 ft. thick, while at lower levels are veins 5 to 10 ft. thick. The extent of these deposits is not known, but it is thought that they will be of considerable local importance because of the large manufacturing interests at Lyon. The coal is particularly suited to gas production, it is said.

## PROPOSE TO SPEND MILLIONS TO HOUSE DUBLIN WORKERS

Providing $43,000,000 worth of dwellings for Dublin workers is one of the big after-the-war projects recommended to the British government by an official ordered to investigate housing conditions in the Irish metropolis. The proposal draws attention to the fact that while the wealthy in this city have built themselves unusually fine homes, the working classes are badly off. The project includes the erecting of 16,500 houses at a cost of $2,000 each, and the purchase and reconstruction of 3,600 old dwellings capable of accommodating 13,000 persons. The cost of the latter phase of the work is estimated at $10,200,000. Many of these old houses were once the homes of the rich, but have long since been abandoned by them and divided up into tenements unsuited to large families and ill cared for by the absent landlords.

Large as the proposed expenditure seems, advocates of the improvement point out that it is small compared with many war items.

## CLEVER CONVERTIBLE COSTUME FOR WOMEN

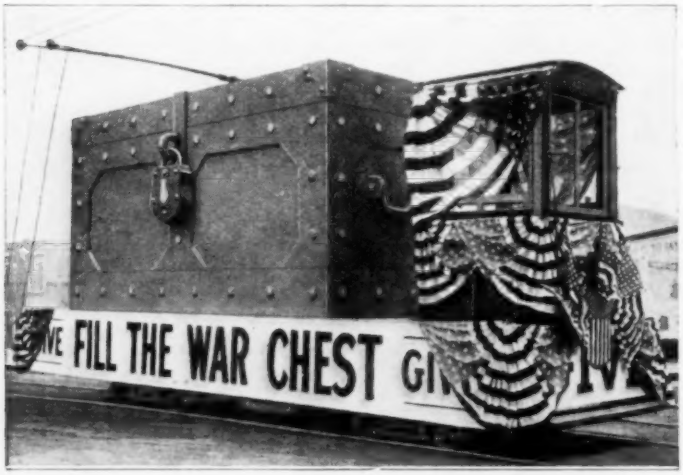
An attractive convertible costume, which marks a desirable simplification in woman's dress and doubtless is a result of the trend started by women war workers, consists of a jaunty bodice and bloomers of black satin and an apron of fine blue serge. For various indoor duties the bodice and bloomers meet all requirements, but when the occasion demands, the apron can be quickly slipped on, giving the whole outfit the appearance of an ordinary street dress. The apron buttons over one shoulder and part or all the way down one side, as the wearer prefers.

Three Views of a New Convertible Costume for Women: The Bodice and Bloomers Are of Black Satin and the Outer Garment, Which can be Quickly Put On or Off, Is of Blue Serge

## BIG CHEST ON FLAT CAR ADVERTISES WAR FUND

A particularly effective advertisement for Cincinnati's general war fund appeared on that city's streets in the form of a huge war chest mounted on an electrically driven flat car. The "war chest" measured 8 ft. high, 15 ft. long, and 6 ft. wide, and had the appearance of being very strongly built, though it was made of

thick pasteboard painted a steel gray. Hanging on the front was a huge lock made of tin, pasteboard, and wood, finished to look like heavy metal.




**Cincinnati's War Chest, Eight Feet High and 15 Feet Long, Which was Carried through the Streets to Advertise the Drive for War Funds: It was Made of Pasteboard, Painted Steel-Gray**

## ONTARIO SOLDIER-SETTLEMENT PLAN IN OPERATION

In a few months interesting results have been accomplished in furthering the interests of some of Canada's returned soldiers who have made application for 100-acre farms in northern Ontario. Two fertile townships on the Kapuskasing River, not far by rail from the town of Cochrane, have been set aside for soldier settlers. Allotments have already been made to 60 veterans. Forty-four of them are now residing with their families in their own homes, while houses for the 16 others are under construction. Much of their land has been cleared and some of it planted to winter wheat.

The Ontario government has established an experimental farm on the east bank of the river. This, in charge of agricultural experts, forms the community and coöperative center. Across the water, on the opposite bank of the broad stream, is the Dominion Experimental Farm, where 800 enemy aliens have been interned and kept at work clearing and planting about 1,000 acres of land.

Some 800 soldiers have applied for farms, and a most excellent scheme has been inaugurated for handling the men before actually turning farms over to them. They are paid $3 a day and given living accommodations and work at the government farm for a certain length of time. During this probation period they not only have the advantage of gaining practical experience in farming, but also have the opportunity of attending classes in agriculture and of testing their qualifications for pioneering. Later, the men's desire for a farm still obtaining, places are provided for them. The general working plan from then on, including the construction of houses and the extension of financial aid, has previously been outlined and is undoubtedly well known. The main point is that the plan has been put in actual operation and is working out advantageously for the soldiers, their families, and the Dominion government.

## ROPE SERVES AS MAGIC GUARD AGAINST RATTLESNAKES

One unaccustomed to outdoor life in the West, on examining the accompanying photograph, would not believe that the two persons in the bed are protected absolutely against rattlesnakes. The secret of this seemingly magic security, as every plainsman knows, is the rope on the sand encircling the campers. It is made of horsehair and, for some reason or other, the snakes have an inconquerable aversion for crawling over it.

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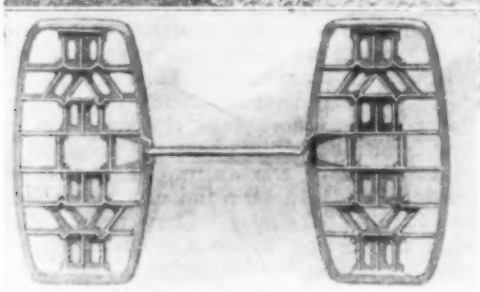
**To the Tenderfoot It Is Almost Unbelievable That These Campers in Their Bed Made on the Sand Are Fully Protected from the Rattlesnakes Infesting the Region. The Secret Lies in the Rope Encircling Them**

# CONCRETE TIES SHOW TREND OF INVENTORS

The Insert Gives a Close View of a Section of Track Where the Novel-Appearing Steel and Concrete Tie is Apparently Giving Good Service under Test

A Section of Main-Line Track, Subject to Heavy Duty, Where Steel and Concrete Ties, Such as the One Represented at the Left, Are in Experimental Use: So Far as Known, They are Holding Their Own

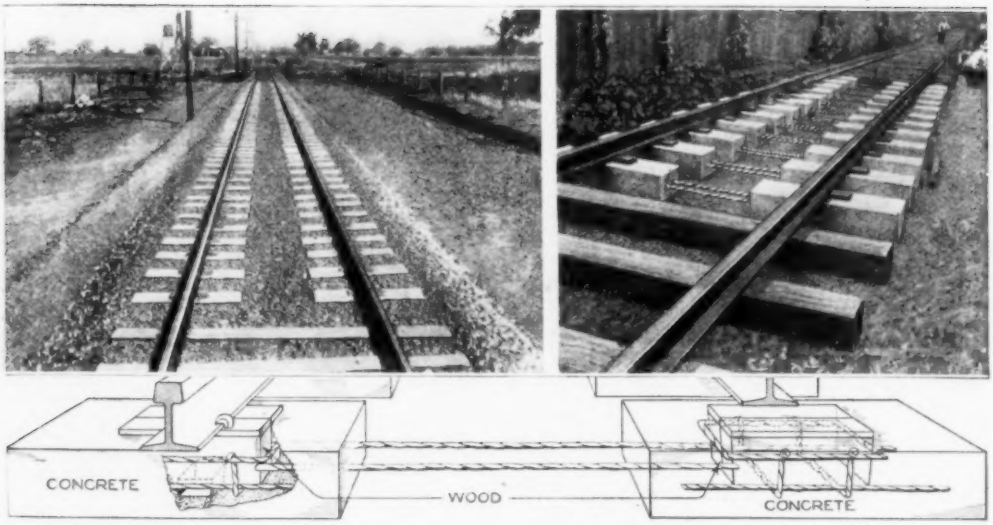


The Picture Above Gives a Clear Idea of the Tie's Steel Skeleton, Consisting of Two Connected Castings Ready to be Filled with Concrete and Used as Shown in the Other Photographs

For some time it has seemed almost patent to many persons that eventually a substitute, not to say improvement, must be found for the wooden railway tie. Many things contribute to this feeling, among them our diminishing timber resources, the increasing size and weight of rolling stock, and the advancing costs of material and labor. These elements and many others admittedly accentuate the desirability of a more or less permanent and easily available type of sleeper. Steel ties and concrete ones are neither new nor untried. Both have been advocated and tested for several years, but the fact remains that so far they have not been adopted. It is interesting, nevertheless, to observe two concrete and steel ties that represent the trend of inventors who are devoting their attention to this problem.

One of these consists of two inverted elliptical, cup-shaped steel bearings filled with reinforced concrete and connected by a T-bar. The bearings extend lengthwise with the rails, which are secured to them by bolts. The arrangement requires a considerably less number of ties per mile than the standard wood tie, yet, on account of the longer bearing surface of the new tie, a greater percentage of the rail is supported than when wooden ties are used. It is claimed that the new type of tie can be furnished at an initial cost per mile that is nearly as low as that of the wooden tie. The design purports to obviate the possibility of center binding, which is one of the difficulties which prevents steel and concrete ties of the conventional beam type from being successfully employed.

A second tie worthy of notice is similarly made of two rail bearings connected by a pair of crossbars, obviously so designed for the purpose of escaping center binding. The end pieces are reinforced concrete and shaped like an ordinary tie. Inserted in each is a wooden block on which the rail rests. This permits the use




**The Drawing Shows the Structural Features of the Concrete Tie Which is Illustrated in the Photographs Reproduced Above. The One at the Left Shows a Section of Ballasted Track with the Ties in Place; the Other, a Similar Unballasted Section**

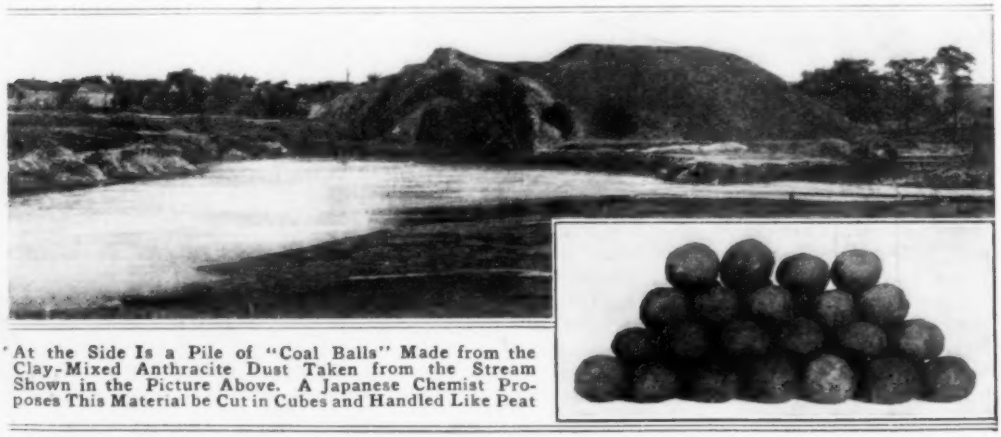
of spikes for fastening the rails, and provides a cushioning effect. The inlaid block may be renewed.

Each of these ties has been given tryouts on sections of different railways where the traffic is heavy.

## CHEMIST URGES ANTHRACITE DUST BE USED LIKE PEAT

Methods are continually being formulated for enabling commercial utilization of the immense deposits of anthracite culm to be found at the coal fields of Pennsylvania. The potential fuel value of this coal dust is disputed, and according to some authorities all schemes for its salvage are worthless because the material itself is worthless. Be this as it may, a Japanese chemist in the Wilkes-Barre region claims to have found that "coal balls" made of culm taken from creek bottoms in that district burn satisfactorily. The clay that is already mixed with the coal dust serves as the only binder that is needed. The chemist's proposal is that creeks in the anthracite region be dredged and the material cut into cubes and handled like peat. The question that naturally arises, of course, is the effect that the noncombustible clay would have.

¶ Efficiency experts have been studying files and find that the life of one of these tools, on the average, is 25,000 strokes. To employ a file for more than its normal period of usefulness, it is claimed, more than doubles the cost of the work.



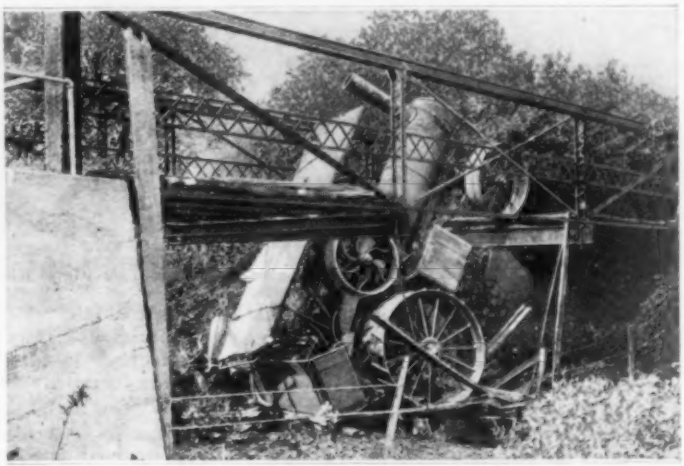
**At the Side Is a Pile of "Coal Balls" Made from the Clay-Mixed Anthracite Dust Taken from the Stream Shown in the Picture Above. A Japanese Chemist Proposes This Material be Cut in Cubes and Handled Like Peat**

## CHAIN OF LANDING FIELDS FOR FLIERS IN AMERICA

Just as mariners need harbors, and motorists service stations, so airmen must be provided with landing fields if aviation is to be properly developed. To meet this need a chain of fields extending across the continent are being laid out and equipped. They will be made easily distinguishable and, like lighthouses, will help pilots to follow a definite course. On these fields, the sites for several of which have already been selected, will be supplies of fuel and oil, maps, charts, and barometer and thermometer ratings. It is proposed also to provide shops where a limited amount of repair work can be done. Many American communities have been quick to realize the future value of providing proper landing fields and there has been keen rivalry among neighboring cities to furnish facilities that will be apt to attract passing airmen.

## FARM TRACTOR PLUNGES THROUGH BRIDGE

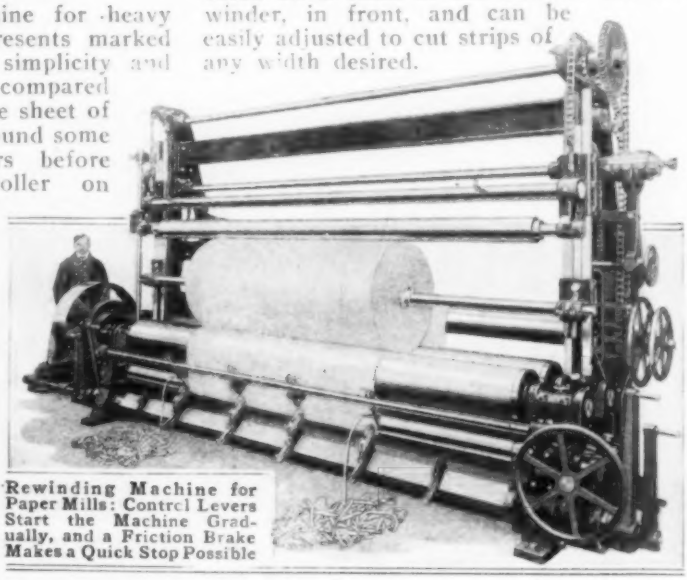
While a heavy farm tractor was crossing a highway bridge in central Illinois recently, the planking gave way and the big machine crashed through the structure to the earth beneath. Fortunately the engineer and fireman, who were operating the engine, were practically uninjured by the crash.



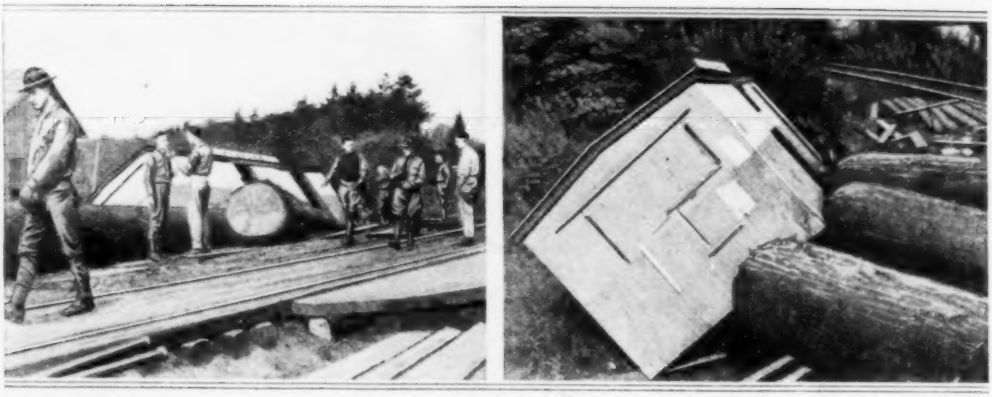
**Farm Tractor Which Plunged, Rear End First, through a Highway Bridge in Central Illinois: The Engineer and Fireman Fell with the Engine but were Uninjured**

## NEW MODEL OF REWINDER FOR PAPER MILLS

A new rewinding machine for heavy work in paper mills represents marked progress toward greater simplicity and efficiency in operation as compared with other rewinders. The sheet of paper is drawn past or around some six idlers and spreaders before finally reaching the roller on which it is wound. To insure even travel, in case the sheet may be of irregular gauge, one of the shafts can be canted by means of a handwheel. At both ends of the machine are control levers which enable the operator to start it slowly and set it at a desired speed. A quick stop, which is a matter of prime importance with a machine of this sort, can be made by means of a friction brake. The circular cutters, of which there are six, are located on a shaft at the base of the rewinder, in front, and can be easily adjusted to cut strips of any width desired.



**Rewinding Machine for Paper Mills: Control Levers Start the Machine Gradually, and a Friction Brake Makes a Quick Stop Possible**



Heavy Spruce Logs Rolled from a Passing Train and Rammed the Box-Car Depot at Clatsop, Oregon, Knocking It into a Ditch, as the Two Views Above Show

## CLATSOP DEPOT IS BOMBARDED BY LOGS ON WAY TO BERLIN

When one considers the importance with which railway stations were rated by airmen on bombing expeditions during the war, it seems fair to assume that Berlin would have rejoiced some weeks ago before hostilities ceased, had it heard of the damage suffered by the depot at Clatsop, Ore. Three spruce logs rolled off a flat car passing the station. They struck the converted box car and knocked it into a ditch. They were later recovered, however, and delivered at a mill, there to be cut into aeroplane material, while the station was soon righted and repaired.

## NEW SPAN OVER MISSISSIPPI AT MINNEAPOLIS

After some years of delay the ninth and largest bridge across the Mississippi River, at Minneapolis, open to general traffic, has been completed, at a cost of $850,000. The structure is a magnificent specimen of reinforced-concrete bridge building. It is 2,162 ft. long and has seven arched spans. In addition to a broad roadway for vehicle traffic there are two 12-ft. sidewalks and a double street-car track. An unusual feature is the slight curve at the eastern end which was provided so that water-power rights of certain flour mills might not be interfered with. At one time, when the project was in its preliminary stages, the plans were changed by the Federal authorities on account of certain geological formations in the river bed.

## OVER MILLION TONS OF COAL SAVED BY "EXTRA" DAYLIGHT

Careful investigation shows that in the seven months of "daylight saving" approximately 1,250,000 tons of coal was saved in this country. Calculations made of the coal consumption in a community of 1,000,000 people indicated that the saving was 17½ tons per 1,000 persons for the period. Figures from other districts showed a similar saving.

New $850,000 Reinforced-Concrete Bridge across the Mississippi at Minneapolis: The Structure is 2,162 Feet Long and the Eastern End is Slightly Curved to Avoid Interference with the Water Rights of Certain Flour Mills

OF all people the English are least concerned with praise for having done what the conscience of the nation understood to be the right thing to do. They never seek applause, nor are they swerved from a course deemed right, for lack of it. It is a sterling quality, which has often been mistaken for mere stubbornness. Among some other things we have discovered during the war, one is that the Huns have insidiously and persistently, for years, sowed seeds of suspicion and hate of the English throughout the world. Because Germany was jealous of England she hated her; and hating her wanted all other countries to hate England also. And so around the world went an army of German spies whose mission was to spread a propaganda of hatred. Germany, ungrateful, had no cause for this. English ports the world over were open freely to German ships to come and go and trade at will. England herself bought from Germany annually millions of dollars' worth of German-made goods in excess of what Germany bought from England. Germans in England were as free to work, travel, sell goods as any Englishman, while the Englishman in Germany was subject to constant surveillance and in arriving at a German city must first of all file a lengthy report containing a personal history, the nature of his errand there, and how many days he intended to remain in that place.

*Great Britain's War Record*

As we all know, it was a question of honor and not necessity which brought England into the war immediately. She, too, with the exception of a strong navy was entirely unprepared, and the world will never cease to owe a debt of gratitude to those brave men, who with only scanty supplies and scantier ammunition, held, actually by a thread, and at awful cost of life, the Hun line, while an army was gathered and munition works were being built. But for the English navy, the war would have ended very differently. But for English ships, also, only 30 per cent of our troops could have reached France.

Of all the great things of the war, none is greater than the magnificent loyalty of the English colonies to the mother country. While they might have remained aloof, without a moment's hesitation they unitedly and heartily rallied to her aid. Of their best of life and treasure they sent from far-distant lands and climes, freely, voluntarily, uncomplainingly. It was a grand spectacle; a mighty tribute.

Because no press bureau was maintained to keep us constantly reminded, there are few of us who as yet begin to realize our debt to Great Britain in this war; but time, which adjusts all these things, will write the story of our debt, and with that understanding will come a truer sense of our obligation.

WITH a silence like that which follows the mighty crash of a great organ, the Great War came suddenly to an end. No longer do the weary soldiers at listening posts strain their ears through long night watches; star shells have ceased to burst and flame over No Man's Land; cannons have cooled; machine guns utter no sound; the exchange of all manner of deadly missiles has stopped. At last Peace, which for four slow, dreadful years has seemed afar off like a mirage, has come. The thousand and one activities of battle, intense to the last ounce of possible human effort, are relaxed. Ships now cross the ocean in safety; smoke from thousands of ammunition plants no longer darkens the sky; tired workers return once more to their homes; armies are demobilizing; reconstruction of devastated homes and farms and factories is contemplated; the dreadful military debauch has consumed itself; the world draws a great sigh of exhaustion and relief; the conflict is ended.

*The War Ends*

In all history no message ever sped so gladly nor so fast, as the few words flashed through the air, and under oceans, and over land wires, until around the whole world and to its uttermost accessible parts the news was carried. What wonder that all civilization gave vent to a frenzy of joy almost barbaric; that men shouted and women wept; and little children witnessed an event which threescore years and ten hence, they will relate to other wide-eyed children. In

our joy let us not forget those millions of fathers whose voices refused to cheer, and those mothers and wives and sweethearts whose eyes were dry, because their hearts were bowed down with a sorrow no victory can ever compensate.

The Huns ceased only when physically exhausted; when their ammunition was spent; when the war had reached their own borders; when they no longer possessed the ability to murder the defenseless; to gas the brave. Their regret is that they failed, but not one single word of penitence for the harm they have done, the sorrow they have caused. Instead they think only of their bellies, and demand, not supplicate, the food they have so wantonly destroyed for years; they whine lest the very cars they stole from France and Belgium be returned to their rightful owners. They have been beaten in what was for nearly four years an unequal struggle, but for any word which has yet come out of Germany they are the same unregenerate Huns who, casting aside all the obligations of a civilized nation, marched into Belgium in August, 1914.

And what of that archconspirator and his associates in power, who with bags of gold have sought hiding in near-by, and so-called neutral countries? Is there no justice in the world? Are these who through long years planned, and spied, and gathered war supplies, and made munitions and trained millions of fighting men; are these—after all their deliberations and crimes against the world—are these to live? Is there any crime in all the annals of evil of which these men are not guilty? Is there anywhere in all the dark, bloody chapter, one single redeeming act, which they can plead for mercy? Were there the slightest spark of remorse, did they possess one element of true manhood, they would long ago have taken their own lives, and cheated justice of her dues. But no; even at this writing there lacks any reliable evidence that the kaiser is not even now still the kaiser of the Huns, waiting only a turn of the wheel of fortune to return to his throne and insult the nations of the world by demanding recognition as one of its rulers.

As merely so many pounds of living, breathing tissue, the life or death of these beings means little; in a few years at most nature will demand her due; but as a principle of right, as an act due those loyal millions who have suffered and died to perpetuate freedom for the world, the allies cannot, must not, hesitate to try, convict, and execute the kaiser and his guilty associates.

### *What of Future Wars?*

AND what of future wars? Will nation war against nation in the days to come, and will the refinement of cruelty in killing be still further developed from its present advanced stage? Just now, with the smoke and smell of battle still hovering in the air; with all its dead and injured and sick fresh in mind, we find it hard to imagine that another war could be.

It is difficult to believe that any nation is likely to deliberately make war upon another nation so strong and powerful as to almost insure the defeat of the aggressor. Germany was positive in her belief of her superstrength to win, otherwise she would have postponed the day until she was sure.

We preserve order in our cities largely by prevention; there are people aplenty who dislike other people to the extent of wishing to assault or even kill them, who nevertheless refrain from doing so because of the presence of police and the fear of punishment. Except for those temporarily unbalanced, the great majority are peaceably inclined. Even were the police inadequate, there is the State Militia, and even the National Army.

Theoretically, a system which suffices to maintain order, and administer justice and punishment, between the citizens of any one country ought to be capable of expansion to maintain order between countries. Probably the one thing which most stands in the way is their lack of acquaintance, one country with another. It is much less easy to understand what a man whom you have never met says and does, than after you come to know him. A remark which sounds offensive may prove on acquaintance to be intended as a compliment. In other words if an international board to maintain order and administer justice between nations is to succeed, its member nations will have to know one another better, and practice the golden rule. A good start has been made; the English, French, Belgians, Italians, Portuguese, and Americans, with representatives of all their several dependencies, have been thrown together as never before.

American tourists bent on a holiday formerly returned to talk chiefly about

the gayety of Paris until we thought all France frivolous; the English were considered a bit distant and haughty, and so on. In the great melting pot of the fighting trenches, the furbelows were all cast aside and the splendid manhood and ideal spirit in each has stood revealed. Preconceived ideas each of the other have been reversed. Even the Hun has little to say about the American being a dollar chaser since the marines chased him out of Château Thierry.

It is well that our President should disregard precedents and attend the Peace Conference. In days to come the heads of our allied countries, and other countries, may likewise well forget precedent and visit us. We might with advantage revise the histories and teach our children the best and grand things in the life of other nations rather than so much of the worst.

People are apt to base judgment on their personal experiences. One unscrupulous exporter can poison a well of foreign sentiment from which hundreds will drink. Never was a time when high moral standards of business meant so much for the future as now. The man who for selfish ends abuses the confidence of a buyer in another country, thereby betrays his own country and is a traitor.

Such an opportunity for mutual understanding and universal good will has never occurred. The time calls for the exercise of the highest impulses and sound judgment, and that same generous, farsighted vision through coming years which the framers of our own Declaration of Independence displayed. A spirit almost of inspiration is needed if the union of nations shall be so framed as to provide a bulwark which the avarice and cupidity of any and all nations shall be powerless to destroy.

## *Revival of Learning*

AS flowers spring up from unpromising battle-scarred lands; as storms clear the air; and the conflagration which seemed only a great calamity is found to provide the long-dreamed-of opportunity for a city beautiful, so too, war with all its awful penalties is not without some compensations. One of these will be a literal "revival of learning" when our boys reach home from camps here and across the ocean.

In the period immediately following the Civil War, there was a great demand for books; following this war there will be a great demand for both books and teachers. With characteristic impatience the average American boy has looked on his school work as almost wasted years, and longs to enter some occupation which at the time seems more constructive, and nearer a man's work. Many are obliged to leave school and go to work for economic reasons; others do so who might have continued their studies.

The organization of our Army and Navy has been a great object lesson to the enlisted men. Not that the one with the educated, trained mind was a whit braver or had better courage than the other, but the essentials to become an officer required a mind trained to think clearly and accurately, and this condition depended on previous study. The ability to accomplish the unusually severe mental task of mastering the course of intensive training in the limited time allowed in the officers' training camps depended very largely on the kind and amount of study which the young man had behind him. Obviously, the man who is thoroughly experienced in the operation of a certain intricate machine could more easily and quickly master some other intricate machine than he whose training and experience had been confined to the operation of the wheelbarrow in which the raw material was brought and the finished parts were removed. The demonstration was unavoidable; the object lesson was plain to all.

Hundreds of thousands who formerly regarded technical training with indifference realized what a distinct advantage it provided, and the desire and ambition to study and master at least some one branch became a fixed purpose. This was evidenced in the call for technical instruction books which by tens of thousands were sent to camp reading rooms. And one of the best things which our boys will bring back with them to civilian life will be this determination to study and learn. A small percentage will return to colleges and technical schools, where there is likely to be a wholesome revision of the various courses which have long been cumbersome. There will be a discarding of many nonessentials, and a greater specialization in the thing desired. There will be less chemistry in an electrical course, and less electricity in the chemical course; Latin and Greek will continue the entrance to a classical course, but should be eliminated as essential to a course in cement engineering or irrigation.

For that great army of boys who cannot return to colleges and schools, but who are determined to learn, there are fortunately the correspondence schools with a choice of studies covering a wide range of practical subjects. There is a certain stimulus to study which comes from the team work of classes, which the solitary student, working alone, lacks; on the other hand, this can be largely compensated in the determination of the individual whose study is purely voluntary. As between the final results of the boy in a class of 100 who does not care to learn, and the one who, working by himself, is bound to master his chosen subject, the latter will be the winner. In no country in the world are the opportunities for study so generous as here; in no other country are the rewards so sure and splendid. In this revival of learning the correspondence schools are destined to come into their own, and render an individual and national service of untold value.

*Fires on Farms*

WHEN a fire occurs in a farm house, or barn, about all the owners and near neighbors can do is to save as much of the furniture or live stock as possible, and try to prevent its spread to other buildings on the place. One of these days, when good roads are universal, there will be one or more motor fire engines in each township which can be summoned by telephone. This will result in a considerable reduction of the present annual loss from fires on farms, which amounts to millions of dollars. The better plan of course would be for each farmer to have his own fire protection, and this is much less expensive or difficult than many might suppose.

It is not so long ago when a farmer would doubt your sanity if you suggested his having an electric-light plant of his own on the place. Today there are thousands of such plants, and increasing in number rapidly. A fire-protection system is just as practical, and before long will be as numerous. The details are simple.

In occasional instances a reservoir on a hill near by, with underground pipe and a few lengths of hose, solve the problem. In most cases it means a large underground cistern whose contents should be sacred and never drawn upon except for fire purposes. A force pump is not expensive and lasts for years. These are already on the market, with gas engine either attached or without, as desired. Practically every farmer now has his gas engine which could be instantly connected to the pump. In a pinch he could make his automobile furnish the power. In peace times the expenditure for cistern, pump, pipe, power, and hose would be easily within the reach of every well-established farmer, and the first fire checked at the start would pay for the entire outfit several times over. Eventually fire-insurance companies would reduce their rates on buildings so protected. With so many power implements already in use on a farm, the starting of the fire pump involves nothing which could not be done by a farmer's wife, boy or girl, and anybody with one arm can hold a hose. Taken in time probably three-fourths of all fires on farms could be extinguished with a few barrels of water if poured continuously. The trouble with the pail-and-carry system is, the supply is too slow, where a steady stream, even if not very large, gains on a fire.

*Throttling the Cables*

IT cannot be denied that the action of the President in taking over the ocean cables five days after the war had ceased is received with great uncertainty regardless of political party. Through the entire period of the war the cables were open to business and the news agencies, subject, of course, to censorship. Now, after the war is ended, and the most important work of statecraft ever attempted is about to be undertaken, does the administration reach out to grasp the ocean lines of communication. The performance and history of the Creel Bureau of Information does not inspire the utmost confidence in the coming reports of the Peace Conference, which apparently are to reach us exclusively through that agency. To all appearances the very first of the 14 principles of international agreement proposed by the President, viz., "No secret diplomacy," is about to be disregarded by its own author.

It is an undertaking of the most vital consequences, when any one man, or set of men, undertakes to decide on the binding conditions by which this nation shall be held in its future relations with other nations. The Peace Conference discussions and proceedings, of all congresses ever held, should be the most open and above board, and for this country, of all countries, to start out with all cables and wireless under the absolute command of one person, cannot fail to arouse a question as to why the American people should not be allowed not only full and free reports of acts of the congress, but also of expressions of opinion of our allies and others. The step is an exercise of an autocratic power conferred to be used as an emergency of war, and was never intended to be carried over beyond the moment of the cessation of hostilities. The country would never have given its approval of such an action in peace times, and resents it now.

"Lay all the cards on the table" is a somewhat common, but very expressive phrase, which represents the feeling of the American people at this time.

⊂▯⊃

*Feeding the Huns*

ALMOST the first utterance from surrendered Germany was a demand on the allies for food, and as this demand was flashing across the ocean, Hun armies, in anything but a famished condition, were marching home. At the same time reluctant prison doors in Germany opened, and through these doors came, by thousands, such wrecks of manhood as the world has seldom seen—walking skeletons who could barely walk, thrust out in rags and shoeless, to make their way, as best they could and if they could, to the allied line. Many never reached that long prayed-for haven, but exhausted with cold and hunger died by the wayside. And it is the people responsible for such fiendish wickedness that reach out their hands and demand the allies feed them!

It would be unchristian, though a just retribution, if the allies could be given the feeding of the Huns for a time, with food of the same nourishing value, and served in the same way as the Huns fed the prisoners of the allies. These same prisoners would know how to serve—those who were tied to stakes without food or water for two or three days at a time, with food in plain sight but just beyond reach. There are many yet alive who have witnessed this refined cruelty of the middle ages, and some who even survived the torture. These would know how Huns should be fed.

And those others who had choice of putrid fish or nothing; and those in whose bowl of thin soup the Hun women spat as they handed it over to French and Belgian and English "dogs." These victims, too, know how Huns fed others.

The starved millions in Belgium, and Poland, and Armenia, whose Red Cross supplies were intercepted and used by Huns; these skeletons would gladly rise from their unmarked graves and help feed the Huns. And innocent children who trustingly smiled as they ate the poisoned sweets, they could tell in lisping words what should flavor the food for Huns. And those who died in torture from drinking at poisoned wells, these also would serve as cup bearers while Huns are fed.

The wicked prosper—for a time. With our narrow span of life we grow impatient because justice delayed seems to us as justice forgotten; but in days to come, retribution is inevitable, and children's children will pay the penalty for the sins of the fathers.

The Huns will be fed; and they will eat the husks of bitter punishment; as they have sowed so shall they reap, and the harvest will be one of sorrow, all in due time.

H. H. WINDSOR

November 26th

## CINCINNATI GETS HUGE FLAG ON VICTORY DAY

A notable Victory Day gift, designed as an expression of patriotism and thankfulness on the part of the donor, was an

**Immense Flag Hanging in Front of the Cincinnati City Hall on Victory Day: The Emblem Was a Gift to the City in Commemoration of the Dawn of Peace**

immense American flag presented to the city of Cincinnati by one of its citizens. The emblem measures 101 by 52 ft. and, when unfurled in the midst of rejoicing on November 11, completely covered the main façade of the city hall.

## LUNGS REPAIRED AND CLEANED BY DELICATE OPERATION

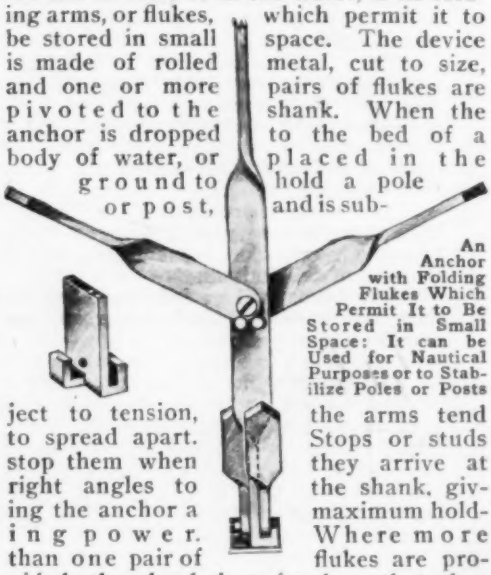
International attention is being directed to remarkable lung operations that have been successfully performed by Col. Pierre Duval of the French Reserve Medical Corps. In describing some of his work to American army medical officers at one of the southern camps a short time ago, he explained that he enters the chest cavity by making a six-inch opening through the ribs. With the aid of forceps he then lifts the lung through the aperture and lays it on the chest wall. The bleeding blood vessels are tied, the outer surface of the organ cleaned, and the tracts swabbed out with gauze. During this procedure the member is manipulated, like a sponge, with one hand. Continuing the work, the colonel has felt his way along the walls of the lung and removed shell fragments and bullets. Torn pieces of the organ have been excised and the wound sutured. After this the lung has been replaced in its normal position and the aperture closed. Two-thirds of the patients who have been subjected to operations of this kind have fully recovered. It should be understood, however, that the lung is not separated from the body, but that part of it is lifted from the chest cavity.

## NEED FOR TOOLS AT TUSKEGEE ON ACCOUNT OF FIRE

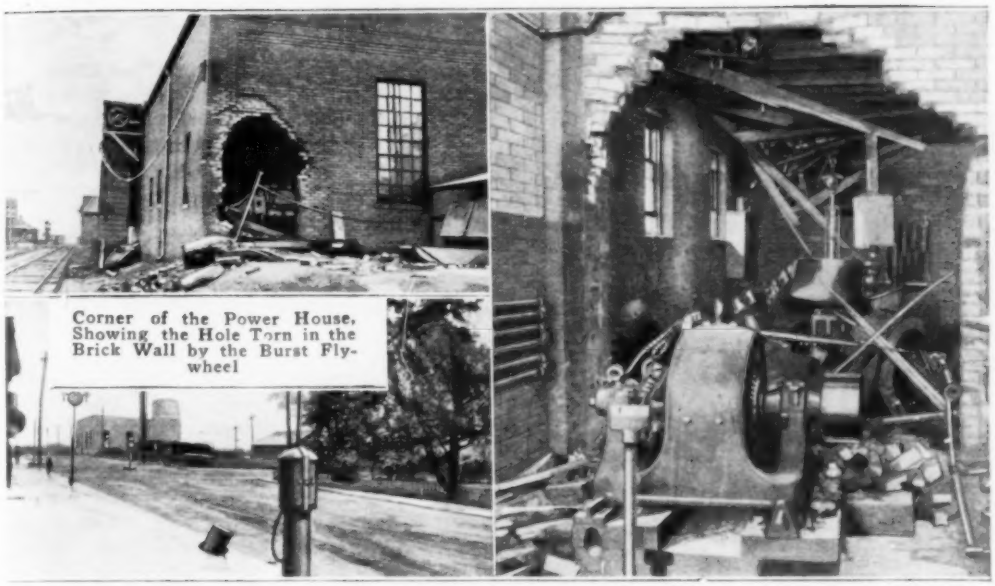
A fire which recently destroyed the Trades Building at Tuskegee Institute in Alabama has so seriously handicapped that school that the management is making an urgent appeal for donations of tools and machinery. Among the trades for which equipment is especially needed are tin smithing, carpentry, wood turning, printing, tailoring, harness making, plumbing, electric lighting, and painting.

## ANCHOR WITH FOLDING ARMS STOWS INTO SMALL SPACE

A feature of a recently patented anchor, for use on land or in the water, is its folding arms, or flukes, which permit it to be stored in small space. The device is made of rolled metal, cut to size, and one or more pairs of flukes are pivoted to the shank. When the anchor is dropped to the bed of a body of water, or placed in the ground to hold a pole or post, and is subject to tension, the arms tend to spread apart. Stops or studs stop them when they arrive at right angles to the shank, giving the anchor a maximum holding power. Where more than one pair of flukes are provided, the shank is twisted so that they point in various directions when extended.



**An Anchor with Folding Flukes Which Permit It to Be Stored in Small Space: It can be Used for Nautical Purposes or to Stabilize Poles or Posts**



Corner of the Power House, Showing the Hole Torn in the Brick Wall by the Burst Flywheel

In the Lower View, at the Left, a Fragment of the Wheel is Imbedded in the Cement Walk, 500 Feet from the Power House Shown in the Background. The Wreckage in the Engine Room is Shown at the Right

## RACING FLYWHEEL BURSTS AND WRECKS PLANT

The destruction wrought by the bursting of a flywheel in an electric-light plant in New Rockford, N. D., recently, indicates vividly the disastrous results which may follow failure to control the speed of an engine. The engine in question was of the Corliss type, and for some undiscovered reason the governor failed to work. The speed of the flywheel, which normally was 100 revolutions per minute, was increased to many times that number. Eventually the big casting burst, and fragments were hurled many hundred feet in all directions. The engine room and the machinery it contained were completely wrecked, except a small generator which, almost miraculously, was unharmed. A great hole was torn in one of the brick walls, and a piece of the wheel, weighing about 450 pounds, was thrown high in the air. It landed in front of a furniture store 500 ft. from the power plant, burying itself deep in the concrete sidewalk. The enterprising furniture merchant hastened to paint an advertisement on the side of the fragment.

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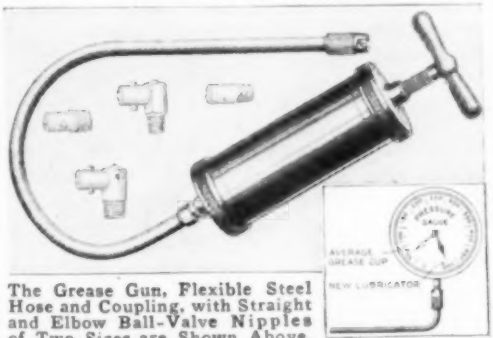
It is stated that during one of the last great offensives of the allied forces the consumption of gasoline by the army and the air forces amounted to about 500,000 gallons per day.

## NOVEL LUBRICATING SYSTEM ELIMINATES GREASE CUPS

Of possible interest to motorists is a lubricating system of late development that provides for the elimination of grease cups from a car. Their place is taken by ball-valve nipples, and periodical lubrication is accomplished with the aid of a cylindrical compressor supplied with a flexible-steel hose and bayonet coupling. The latter enables connection to be made with one of the nipples without prolonged screwing. Grease is forced into the bearings under high pressure so that the used lubricant is discharged simultaneously.

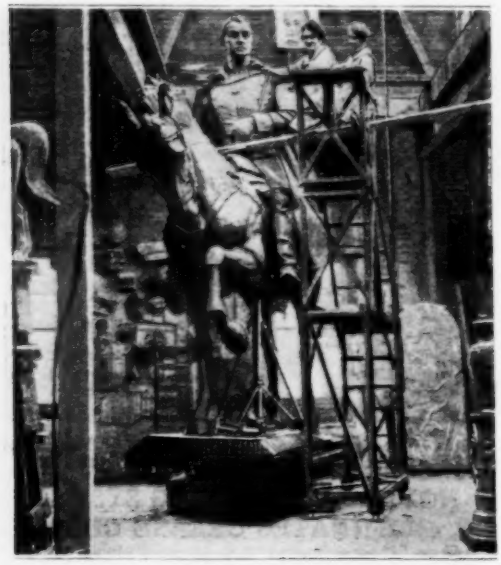



The Grease Gun, Flexible Steel Hose and Coupling, with Straight and Elbow Ball-Valve Nipples of Two Sizes are Shown Above. The Indicator Hands on the Dial at the Side Show the Difference in the Pressure Exerted by the Average Grease Cup and the New Lubricator

When grease cups on a car are integral with shackle bolts, a special cap with a ball-valve nipple attached, is used.

## THIRD MEMORIAL TO BOLIVAR ACCEPTABLE TO NEW YORK

After two previous unsuccessful attempts on the part of the Venezuelan government to present the city of New York with a permanent memorial of Simon Bolivar, a satisfactory equestrian statue of the famous South American general and statesman has been executed and will be erected in Central Park. The monument is the work of a New York sculptress and has won the praise alike of the Venezuelans and of American art societies. It is of bronze and represents the popular hero mounted on a spirited horse. In 1883, a statue of Bolivar was erected in New York, but was so severely criticised by artists that the Venezuelan authorities finally ordered its removal. In 1897, another sculptor was commissioned to make a statue of the same subject for New York, but his work was rejected and so was never erected.



**Statue of Bolivar, the Venezuelan Hero, a Gift from Venezuela to New York City: Two Previous Statues of the General, Intended for New York, Proved Unsatisfactory**

## GERMANS RESORT TO BELTS OF WOVEN PAPER

An indication of the straits to which the war brought the Germans with respect to certain materials is found in the fact that they resorted to making machinery belts of woven and braided paper. The paper fabric was cut into lengths of perhaps 100 feet and was subsequently used in making belts of the desired width and thickness. A core of cotton, sheet metal, or of interwoven thread and wires, was surrounded with paper strips and the whole was sewn with strong thread, making a belt both strong and flexible, it is said.

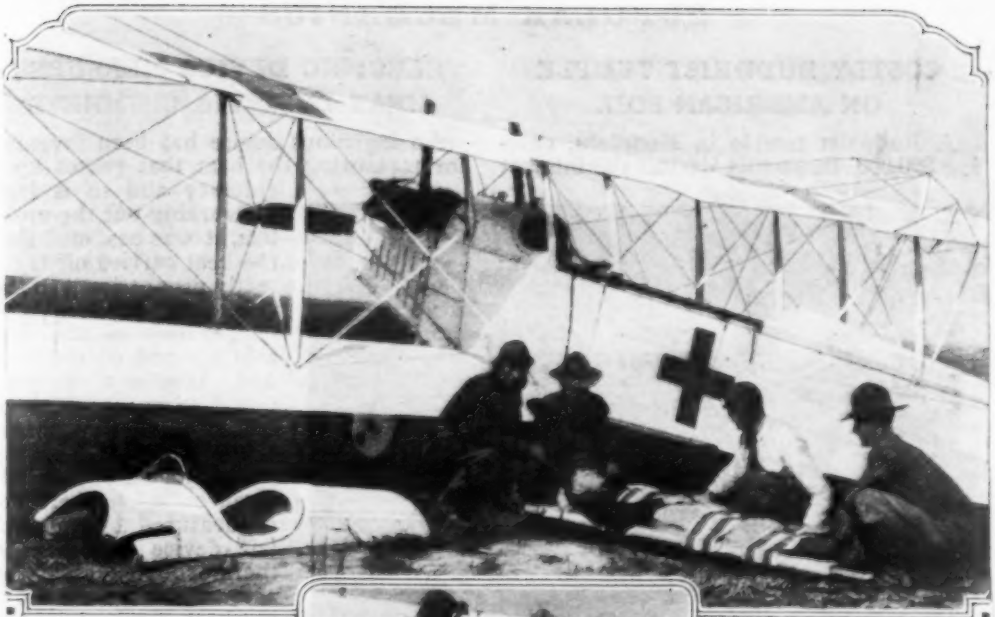
¶Much excitement has been created in Dutch East India by the discovery of rich iron-ore fields on the Island of Celebes. It is estimated that there are 1,000,000,000 tons of ore in the district in question.

## FLYING HOSPITAL WAS LAST GREAT WAR INNOVATION

One of the most interesting of the innovations in military aeronautics introduced before the war's collapse, was the flying hospital. The marked success that attended the development and use of aerial ambulances, employed for quickly conveying seriously wounded soldiers to surgical stations, suggested the feasibility of reversing the scheme by conveying surgeons to patients in the field.

Like the first aerial ambulance, the flying hospital was a French invention. It is not known whether or not a complete squadron of machines, as planned, had actually been commissioned before the truce was signed. One of the specially outfitted units, however, is described as carrying, in addition to the pilot, a surgeon and an X-ray operator. Its equipment consisted in part of a folding X-ray table, supplied with the Mondain cap for daylight work and the Nemirovsky compass for locating shell fragments and bullets; a folding combination lavatory and instrument stand, and an electric sterilizer.

When the plan was first broached, it was thought that one or possibly two of the flying hospitals could serve a front of approximately 125 miles. It was reasoned that at periods of emergency, when advance posts without X-ray and operating equipment were overwhelmed, a flying hospital could be dispatched in response to a telephone call for assistance. If need be, its equipment and staff could be delivered at the post and the machine returned to headquarters to pick up another outfit and its operators. How the scheme actually worked out in practice yet remains to be told.



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The Picture Above and Those Accompanying It Show the First American Aerial Ambulance in Use. The Machine, Painted White and Bearing the Emblem of the Red Cross, was Designed for Carrying Dangerously Wounded Soldiers Quickly to Field Hospitals or Surgical Stations

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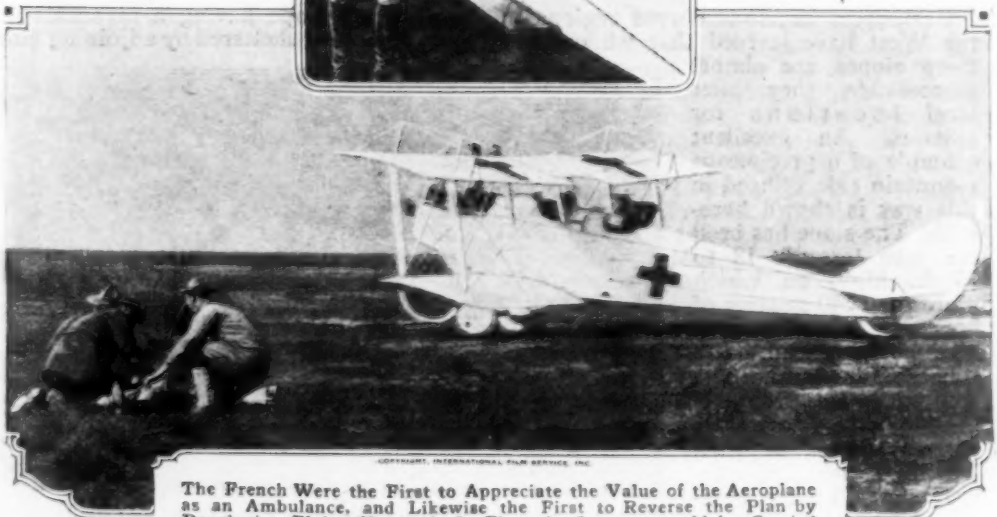
While the Photograph Reproduced Above Shows How a Patient is Securely Strapped to a Stretcher, the One at the Side Explains How, After This Operation is Completed, He is Placed in the Body of the Plane and Made Ready for a Brief Flight over the Lines to Some Point Where He can Obtain Surgical Attention



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The French Were the First to Appreciate the Value of the Aeroplane as an Ambulance, and Likewise the First to Reverse the Plan by Developing Flying Hospitals So That the Surgeon could be Carried to the Patient Instead of the Patient being Carried to the Surgeon

## COSTLY BUDDHIST TEMPLE ON AMERICAN SOIL

A Buddhist temple in Honolulu, costing $90,000, frequently excites the interest of visitors, for it is one of the very few houses of worship of this sort to be found under the American flag. It is said to be the only Buddhist temple which is built of reinforced concrete. Local Japanese contributed the funds for its construction.

**This $90,000 Buddhist Temple, at Honolulu, Is an Object of Unusual Interest Because It Is One of the Few Houses of Worship of This Sort under the American Flag, and is Said to Be the Only One Built of Concrete**

## ELECTRIC DEVICE MEASURES HEAT LOST VIA CHIMNEYS

An ingenious device has been invented for measuring the heat that passes up a chimney and so is lost. In working out the problem, it was assumed that the heat carried off is directly proportional to the difference between the temperature of the outside air and of the flue, and inversely proportional to the percentage of carbon dioxide, measured by volume, in the escaping gases. The difference in temperature is measured by an electric device known as a thermocouple, while the amount of carbon dioxide is ascertained by the change in the electrical resistance of a solution of caustic soda occasioned by the absorption of the carbon dioxide and the production of sodium carbonate.

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¶ Certain old warships owned by Venezuela, Colombia, Argentina, as well as one owned by the British, have been successfully transformed into cargo carriers.

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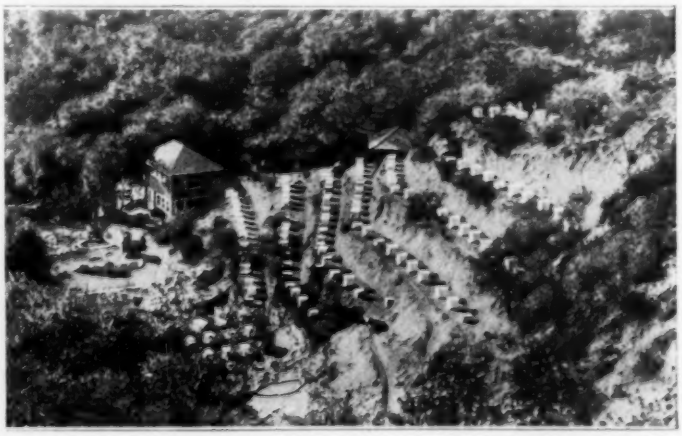
## BIG APIARY ON TERRACED MOUNTAIN SIDE

Beekeepers in mountainous regions in the West have learned that while many steep slopes are almost inaccessible, they offer ideal locations for apiaries. An excellent example of a precipitous mountain side utilized in this way is shown herewith. The slope has been cut into terraces 12 to 15 ft. high, on which more than 300 swarms of bees are housed, each hive being placed on a concrete foundation. The land put to this profitable use would be worth little for any other purpose. The hives, being high up, are fanned by the summer breezes and are warmed by the sun in winter, the slope having a favorable aspect and being sheltered by adjoining hills.



**Slope Too Steep for Ordinary Cultivation, Which Makes an Ideal Location for an Apiary: Each Hive Rests on a Concrete Foundation, and There Are Some 300 of Them in This Colony**

## SUPPLY TRAINS AT FRONT MADE UP UNIFORMLY

In providing transportation for the enormous amount of supplies needed by American forces at the front it was necessary for the military railroad authorities to work out a system of making up trains which required a minimum of supervision and would be absolutely uniform day after day. At the time when fighting was still in progress 15 of these "automatic trains," as they were called, were started each day for their respective destinations. Each was made up of 50 cars. Undoubtedly a similar system of operation has been employed more recently in supplying our forces of occupation with food, clothing, fuel, and so on. The village which served as the railway headquarters had to be provided with 72 miles of yard tracking to take care of the cars used. The population has increased tenfold.

## FOOT REST FOR MOTORISTS MAKES CONTROL EASIER

An automobile accessory which will be appreciated particularly by motorists who sit long at the steering wheel, is a rubber-bound foot rest intended to be screwed to the car floor just back of the accelerator. It can be adjusted to hold the driver's foot at the proper height with respect to the accelerator, and in case the car strikes a bump, it prevents accidental pressure on the control. It also relieves the muscles of the leg from tension due to holding the ball of the foot continually in an upraised position.

¶The government has taken possession of and now controls all marine-cable systems owned or operated by American concerns. This includes several transatlantic cables, one 10,000 miles long extending to China, one extending from New York through the Panama Canal and down the west coast of South America, and several others.

## NEWSPAPER-STUFFING MACHINE ELIMINATES HANDWORK

Considerable interest is being manifested in a newspaper-stuffing machine

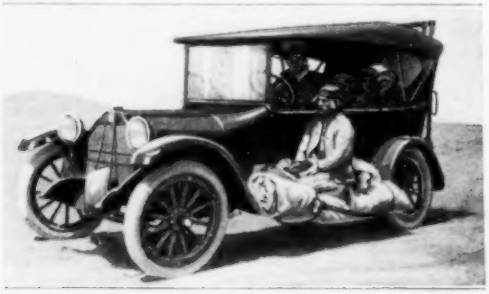
The Newspaper-Stuffing Machine at Work Assembling Four Sections of a Sunday Morning Paper in One Operation: By Adding Other Units, the Capacity of the Apparatus is Increased to Accommodate as Many Sections as may be Desired

that is reported to accomplish the work of a dozen or more persons. The task of assembling the several sections of the bulky Sunday morning and special editions of metropolitan newspapers has always been a manual operation that has called for the weekly employment of much extra help. The new machine consists of a series of connected units. A four-head apparatus, intended for handling a four-section paper, assembles 28,000 sections into 7,000 complete newspapers in one hour. By adding two more units of the apparatus, for instance, provision is made for stuffing six sections in a single operation. In practical use, it has been demonstrated that the machine soils or tears less than one newspaper in a thousand. In the event that the mechanism feeds two sections at once, or fails to insert a section, the machine stops automatically.

## INDIANS, BOYLIKE, BEG RIDES FROM MOTORISTS

One of the typical outcroppings of the boyishness in the character of the average primitive Indian, in New Mexico and elsewhere in the Southwest, is his fondness for taking short rides in passing automo-

biles. Many drivers obtain quite as much pleasure in taking on one of these silent, dark-skinned passengers as the latter does in riding at good speed. Having ridden as



**Motorist in the Southwest and One of the Indians Who Asked for a Ride for Himself and His Dog**

far as his fancy dictates, the Indian will get off the running board, if that is where he has been riding, utter his thanks in gutturals, and wait until he can flag a car that will take him back.

## LOCOMOTIVE OUTPUT DOUBLED UNDER STRESS OF WAR

One of the most remarkable achievements in speeding up industry to meet the war's demands is to be found in the record of manufacturers of standard-gauge locomotives in this country, made under the direction of the War Industries Board. For a period of several months the output was increased approximately 100 per cent. Even more striking is the fact that this was done without spending a single dollar to increase manufacturing facilities. Orders were redistributed among the various plants in a way which permitted each concern to concentrate on particular types of locomotives. Furthermore the "Pershing" engine, as it is called, was a standardized machine which was the sole type employed by the American forces in France. It was also adopted by the French and British with a consequent saving in time and money.

# SUBMARINE SPOTTING FROM THE AIR

By HENRY A. BRUNO, Late of R. F. C.

SUBMARINE hunting was a fascinating war sport if one was on a patrol boat or fast torpedo-boat destroyer, but it was doubly so if the hunt took place in the air in a big naval seaplane. In order successfully to discover the underwater boats a definite campaign must be carried out with all units coöperating.

The planes used in this kind of work differ a great deal from those used on land and also from the ordinary naval hydroplanes. The H. P. B. 800 hp. was the favorite type. This is a large five-man seaplane, equipped with two 400-hp. motors. It is well armed with six machine guns, coupled two together. Four of these guns are American Lewis, one set of two being placed in the front of the plane on the projecting nacelle and the others in the rear of the main planes, allowing an arc of fire over and above the tail. The remaining two are British Vickers, pointing downward through the floor of the front part of the nacelle or fuselage, thus enabling the gunner to sweep the sea below with a hail of fire. Six or more H. E. depth bombs operated by an accurate trigger and bomb sight complete the armament. A pilot, second pilot, two gunners, and a first-class mechanician composed the crew. Being a pusher, there are no whirling propeller blades to interfere with quick maneuvering of the guns, and a clear view ahead is always obtained.

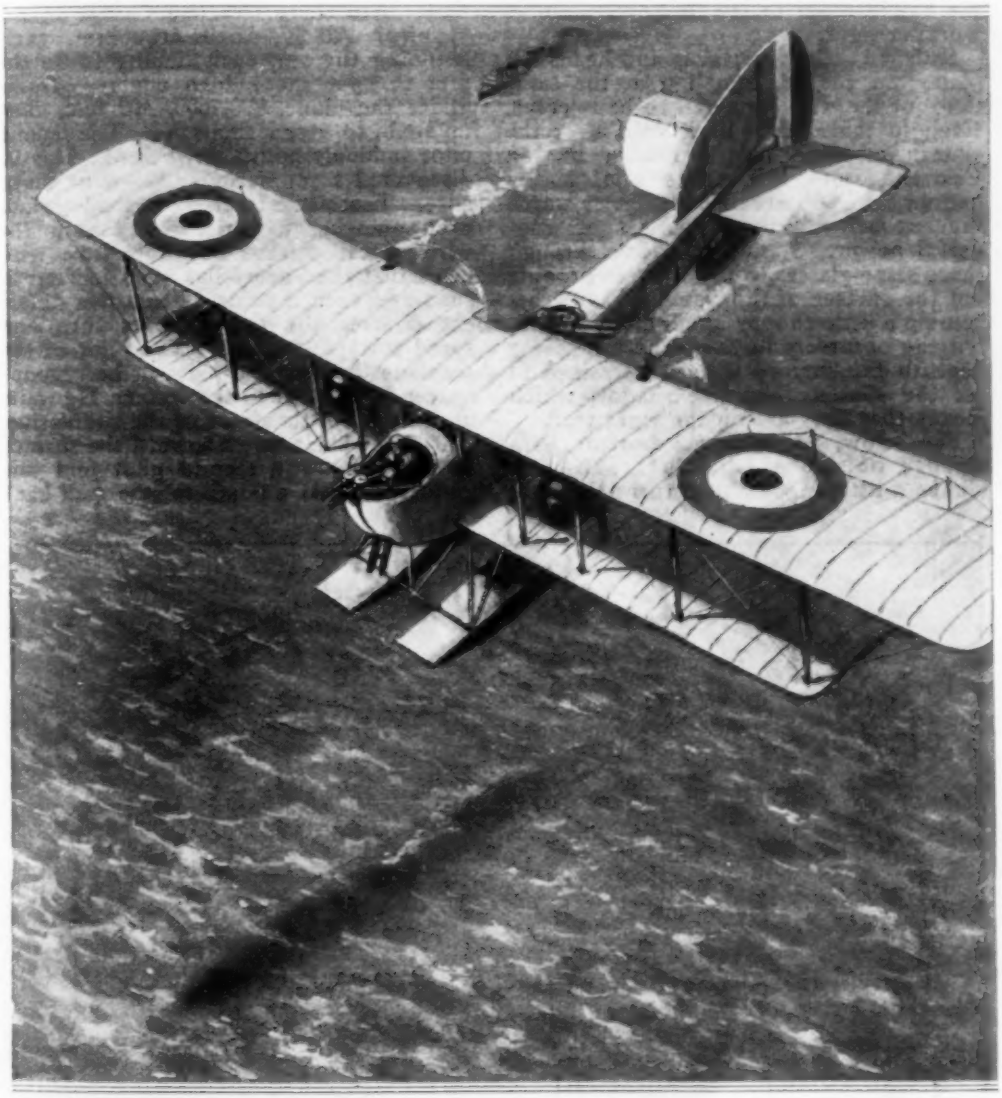
To understand just how exciting submarine spotting really was, it will be necessary for me to transport you to an isolated spot on the coast of Northumberland, in the north of England. Hidden in a small bay, and cleverly camouflaged, are several large hangars with runways leading into the water. It is almost daylight and one of the seaplanes is pushed out of its hangar and is soon resting on the water.

While the mechanicians are busy removing the covers of the huge twin motors, other willing assistants are fastening the machine guns to their supports on the nacelle. Guns are never left on a plane while it is off duty. Each one is taken to the gunnery shed and thoroughly cleaned and oiled. The two pilots appear, both sleepily rubbing their eyes, and are soon joined by the rest of the crew. But the plane is not yet ready. The wireless transmitter does not give out a fat enough spark, so a new apparatus is installed. Wireless played an important part in this work and a badly operating instrument might allow a submarine to get away. The bombs and containers of ammunition for the guns were placed aboard before

the plane left the hangar, and as the chief mechanician signals O. K., the crew climbs aboard. The chief pilot has a map which shows the area over which he is to fly, also at what points he will find patrol and other allied boats, all ready to coöperate in catching a submarine.

Each section of the North Sea was divided into areas, and had a certain number of allied boats operating in it, all of which were known to the pilot before he started. These boats had distinguishing marks easily visible from a great height in the air, and seaplane pilots would attack any strange boat in the area of patrol. Several submarine mother ships were discovered by this plan and, needless to say, they never returned to their base.

The seaplane's powerful motors come to life with a roar, which is quickly silenced as the new muffling attachment is thrown on. While no means have as yet been found to make aeroplane motors absolutely noiseless, the Royal Naval Air Service planes have a device which cuts down the noise almost three-quarters.



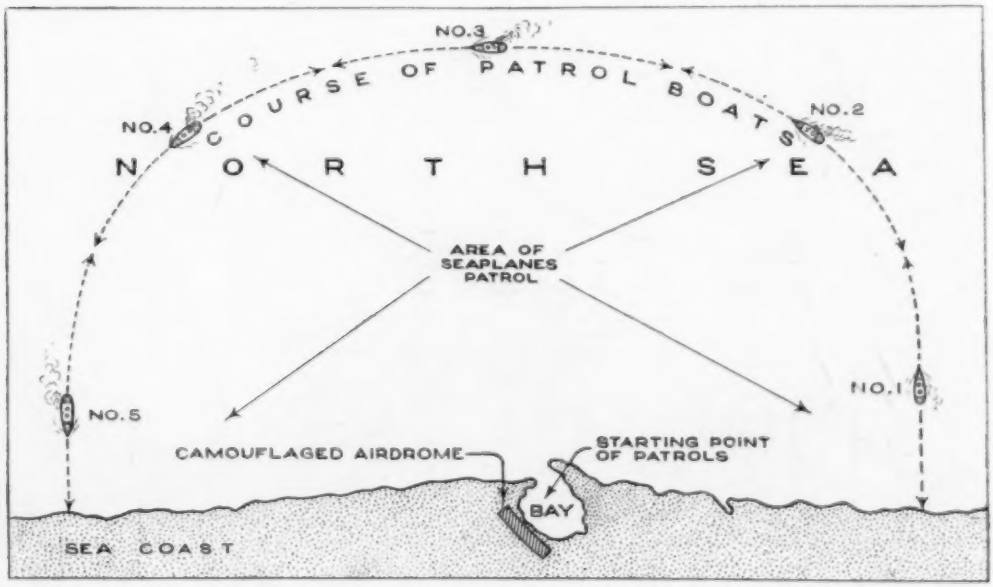
*"There it is! A dark shadow not even showing a periscope. Again the wireless call flashes out, this time with news that the enemy has been located at such and such a point. From five different courses the patrol boats turn and speed toward the spot. The pilot of the seaplane is not idle; down he swoops nearer and nearer to the water."*

The first rays of the rising sun catch the weird coloring on the plane's wings, which are camouflaged so as to make the machine almost invisible at a certain height. Obedient to a wave of the pilot's hand, the mechanicians stand clear and the plane glides out over the smooth waters of the bay, rising into the air in an incredibly short time. Although very large, these planes will make 120 miles an hour, are very stable, and easily handled both on sea and in their natural element, the air. The pilot climbs slowly until he is about 1,800 feet, then circles twice over the bay in order to see that everything is working right.

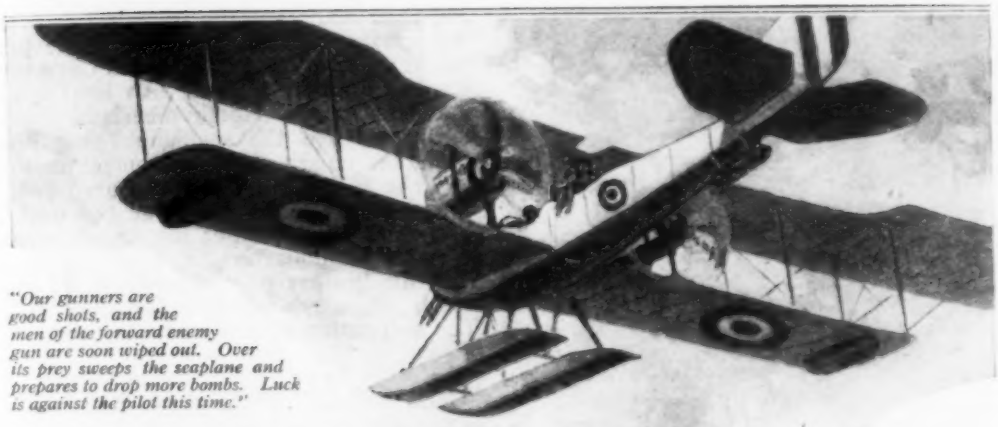
Satisfied at last, he turns and heads the plane out to sea, signaling at the same time for the wireless aerial to be released. Even in midsummer it is cold over the water, and every man is muffled like an Eskimo. Both the second pilot and a gunner act as observers and eagerly watch the sea below through glasses of wonderful power. Should you look through those same glasses, you would see nothing but the surface of the water, which is becoming a little choppy under a stiff breeze, but the observers in the plane are seeing beneath the surface with eyes trained to see the slinking cigarlike shadow which means that they are on the right trail.

Far below, and near the horizon, is a smudge of smoke. A ship! The pilot climbs a little higher, then turns the nose of the plane straight for the distant object. A few minutes later, H. M. torpedo-boat destroyer "87," seeing the circling plane, breaks out the agreed signal and immediately the wireless on the seaplane is flashing down the "all clear" message. Banking steeply, the pilot heads off in another direction, and four times in the next half hour picks up the patrol boats assigned to his area. Each boat has a certain course to patrol and the seaplane keeps in touch with each one, ready to signal when the prey is found.

The plane is well out of sight of land now. Are there any submarines in the vicinity? All five of the crew are eagerly scanning the sea, each hoping to be the first to spot the hidden enemy. Down glides the plane, 800, 600, 400 feet, then up again to over a thousand. The second pilot suddenly points downward. Has he discovered a submarine? He must make sure. There it is! A dark shadow, not even showing a periscope. Again the wireless call flashes out, this time with news that the enemy has been located at such and such a point. From five different courses the patrol boats turn and speed toward the spot. The pilot of the seaplane is not idle; down he swoops nearer and nearer to the water. He waits until he is a little ahead of the submarine, then dives like a hawk toward the surface of the sea. The second pilot and one gunner, each at a bomb release, pull back




**Plan View of Coast and North Sea Showing How an Area is Patrolled by Ships and Seaplanes: Once inside This Area a Submarine Is Almost Sure to be Discovered and Sunk**



*"Our gunners are good shots, and the men of the forward enemy gun are soon wiped out. Over its prey sweeps the seaplane and prepares to drop more bombs. Luck is against the pilot this time."*

the levers and two depth bombs drop like plummets. A quick bank and the plane rocks from the explosion; then, with the motor throttled, the machine dashes down in a nose dive. No, the pilot is not hit by his own bombs; he wants to observe the damage done. Up from the depths comes the submarine, a big one, rolling like a log and evidently badly holed. Men appear on its deck, hastily manning two guns which have appeared out of the hull. Despite the fact that they are having a hard time to keep their footing, they commence firing at the huge bird which has routed them from the very depths of the sea. A shell bursts near the plane; then another. The pilot climbs swiftly, banks almost vertically, then dives again, and this time the machine guns begin to add their staccato reports to the noise of the larger guns on the submarine. Our gunners are good shots, and the men of the forward enemy gun are soon wiped out. Over its prey speeds the seaplane and prepares to drop more bombs. Luck is against the pilot this time; a shell bursts too close, the right motor sputters, and stops despite the efforts of the mechanician. The plane wavers, then starts to glide down. A wobbly glide indeed, reminding one of a wounded duck. With a splash it pancakes into the water and hardly has it settled before shells from the sinking submarine's remaining gun commence dropping near by. Help is at hand, however. Powerful shells whine overhead,

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**Part of the Throng of a Million or More Exulting Americans Who Filled the Streets of Chicago's Loop throughout "Victory Day"; Never has the City Seen Such a Stupendous Manifestation of Patriotism and Joy and Never did the People Express Their Feeling in Such a Variety of Ways**

find their mark, and the water closes over the remains of the submarine. The patrol boats have come in time and Germany has lost another U-boat. An hour later watchers at the Northumberland coast aerodrome see the seaplane flying low under the power of its undamaged motor and the feeble help of its injured twin, and shortly after it settles on the water. The chief pilot fills out his report, turns it in at headquarters, and in company with his brother pilot tramps off up the beach in search of a well-earned rest. The submarine spotting trip is over.

## COMING OF PEACE HERALDED BY UNPRECEDENTED SCENES

For giving expression to the wild joy and the deep thankfulness which swept over America on November 11 at the announcement "Germany surrenders!" no formal demonstrations could have been adequate. In the enthusiasm of those first hours of peace, men, women, and children rushed into the streets and mingled their shouts in a delirium of exultation that no participant will forget. In New York, Chicago, and other large cities the celebrations were of unprecedented magnitude, all the streets in the business districts for many blocks being filled with the surging multitudes. But in every smaller city, village, and hamlet the same high pitch of enthusiasm was reached. Bands played, and were drowned out by the shrill horns of those about them. Automobiles, trucks, and street cars were crowded with uninvited, but welcome passengers, and passed at a snail's pace through the throngs. As in the case of the smaller, premature celebration of a few days before, the air was filled with confetti improvised from waste paper. Everywhere signs and effigies proclaimed the people's scorn of militarism and its leaders.

## HOLLOW CONCRETE CASTINGS MADE WITH ICE CORES

An inventor in Munich is said to have overcome certain difficulties heretofore met with in casting hollow concrete objects, completely inclosed, by using ice cores. The ice is cut into the desired shape and size, and after the concrete has set about it, the core is allowed to melt and run out through small openings. Large and small objects can be cast in this way.

# INFANT MOTOR CAR CLIMBS BOSTON CAPITOL STEPS

After making a seven-hour trip from New York to Boston, a mosquito-sized motor car recently astonished a crowd of onlookers by crawling up the steps of the state-house in the latter city. The machine, built on the lines of a racing car, is equipped with a capable motor that drives it at high speed and endows it with adequate power for spectacular grade-climbing feats. Although only broad enough to receive the driver, the tiny car is fitted on the right side with an outboard seat for a passenger.

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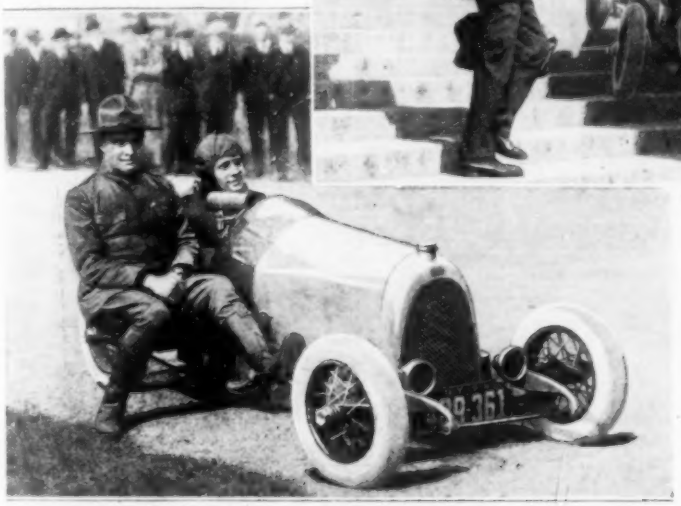
**One of the Car's First Capers, upon Reaching Boston, Was to Scamper up the Steps of the State Capitol by Way of Demonstrating Its Hill-Climbing Power**



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**The Motor Car of Itself Is Large Enough to Accommodate Only the Driver, but an Outboard Seat on the Right Side Enables One Passenger to be Carried**

## BIG CIRCUS TENTS SHELTER FEED DEALER'S SURPLUS

The shortage of freight cars, prevalent some time ago, placed a large western dealer in feeds in a serious predicament because his storage facilities were insufficient to care for the quantities of material which accumulated because of inadequate shipping facilities. The difficulty was solved by procuring five large tents from a circus which was wintering near by. In these big, white shelters about 20,000 tons of feed were protected from the weather.

¶ The shipping board has been authorized to commandeer boilers or other machinery that may be needed to quickly outfit a vessel just launched.

**View of Feed Dealer's Establishment, Showing One of Five Circus Tents Which He Procured to Shelter Accumulated Hay, and the Like, Until Cars could be Obtained for Its Shipment**

# CHICAGO BOYS

## Schools Make Vacant Tracts Farms and Send Eager Lads

By JOHN

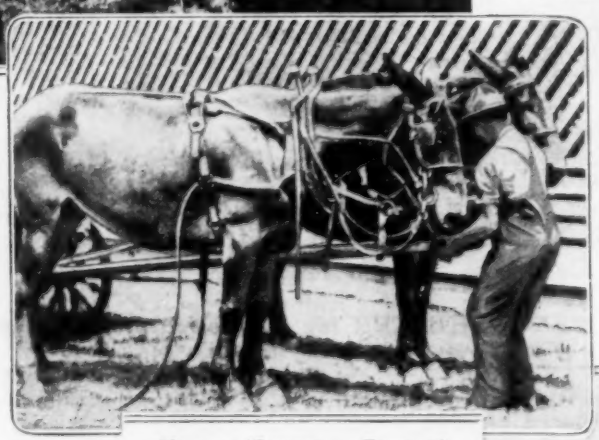
AN agricultural high school for several hundred city boys, on a real farm of 640 acres within city limits, is the educational innovation which has been determined upon by Chicago's school authorities. The movement, of which this is an outstanding feature, has already resulted in supplying hundreds of farm hands from the ranks of flat and tenement dwellers and in training boys in scientific agriculture on various unimproved tracts of city land.

Some of the Hard Work That Gave the Boys Appetites and Strength They had Not Known in the City

The whole undertaking on the part of the Chicago authorities promises to be one of the biggest boosts ever given the back-to-the-land movement. While others have sought to induce mature workers to give up city life for the country, by this plan the city boy is taught the ways of the farm before his habits are fixed and before his trade or profession is selected.

Boys from two Chicago high schools spent the past summer operating an 80-acre "farm" near the northwestern limits of the city. One group devoted mornings and the other afternoons to plowing and planting this land, a farm tractor being part of the equipment provided. The boys received school credits for their work, which was done under a competent instructor. Many of them enthusiastically continued their work through the summer and fall, harvesting the crops in good style, and showing marked improvement. Operating the tractor was especially enjoyed.

The success of this experiment has encouraged the authorities to select, tentatively, a square mile of school land in the southwest section of the city where it is proposed to erect a splendidly equipped agricultural high school. Until conditions make such an im-



How to Harness a Team of Mules Was Quite Bewildering at First

BY COURTESY OF HENDERSON FILMS, INC.

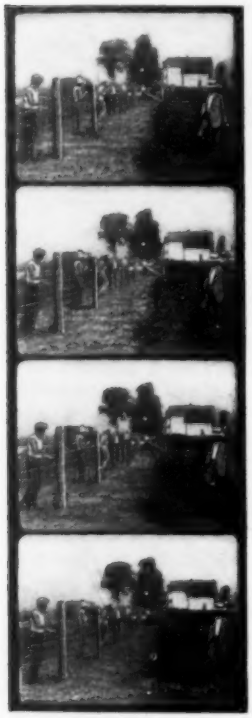
Every Boy is Learning to "Hoe His Own Row" in a Literal Sense and He may Some Day Find His Knowledge of Much Value

# BECOME FARMERS

## within City Limits into Real to Work in the Country

ANSON FORD

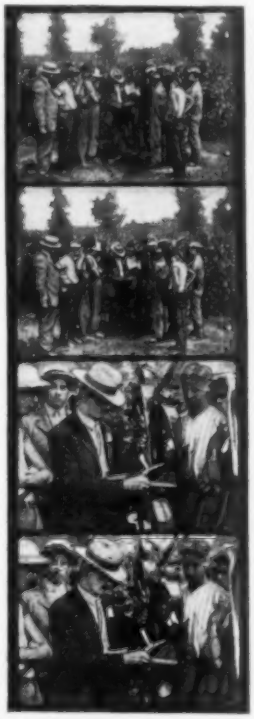
provement possible, Chicago south-side schools near the tract will undertake its cultivation, following the plan already indicated. If practicable, barracks may be erected here where boys can live at certain times of the year under a system of instruction which will include military training as well as farming. Fall plowing has already been done on a 150-acre tract in another section of the city, and some twoscore boys on the city's west side are becoming embryo farmers.



BY COURTESY OF HENDERSON FILMS, INC.
**Movie Glimpses of Chicago Boys Learning Fence Building**

Another phase of the Chicago schools' new interest in agriculture, supplementing the instruction on city farms, has been the sending of hundreds of boys into the country as farm hands, under the supervision of the school authorities. In the spring of 1917, 700, out of 1,500 boys who made applications, were sent to the country and earned a total of $42,583. The lads made good, though some of them were "so green that the cows almost ate them," to use one boy's expression.

Each boy, on returning to school, brought an affidavit from his farmer employer in which the latter stated the character of his helper's work. Less than a dozen classed the labor as unsatisfactory. Many of those who went last year were coached before leaving so that they knew something about hitching up horses, handling planters, cultivators, etc. The amount earned by the boys the second summer was approximately $150,000. This second group was asked by Dudley Grant Hays, who was the director in charge of the work, to report on the character of the treatment



BY COURTESY OF HENDERSON FILMS, INC.
**Lads Raised in Flats and Tenements Studying Field Corn**

**High-School Boys Breaking Ground on the 80-Acre "Farm" in the Northwest Part of the City: Groups from Two Schools Planted, Cultivated, and Harvested Crops Here**

given them by the farmers. With very few exceptions the comment of the boys was, "Fine!" and some of them took pains to add other words of appreciation that would have done their new country friends good.

A large number of these city-bred farm hands and workers on the schools' own farming tracts are determined to take up farming as a livelihood. The farm-employment service has been incorporated into the United States Boys' Working Reserve, a movement national in its scope, which has profited immensely by the pioneering which Chicago has done in this field. Within a short time farming will be brought to many cities, as it has been to Chicago, and thousands of lads from various cities will be sent to farms. In this way a great new impulse of a most practical character is being given to the back-to-the-land movement.

## CLIMBS TO SKYSCRAPER ROOF TO ADVERTISE WAR FUND

Of the many spectacular feats employed to advertise the United War Work campaign, none caused more spectators to gasp with astonishment than that of an

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**Acrobat Equipped with Special Climbing Apparatus, Ascending to the Roof of a New York Skyscraper: This View Shows Him Passing the 28th Story**

acrobat who climbed a rope stretched from the ground to the top of one of New York's tallest skyscrapers. By means of a clamp with horizontal foot rests, to which his feet were strapped, and a gripping member fastened to a belt about his chest, the performer was able to draw himself up with apparent ease.

## SOLDIERS IN OVERLAND RACE WIN RICH CANADIAN PRIZE

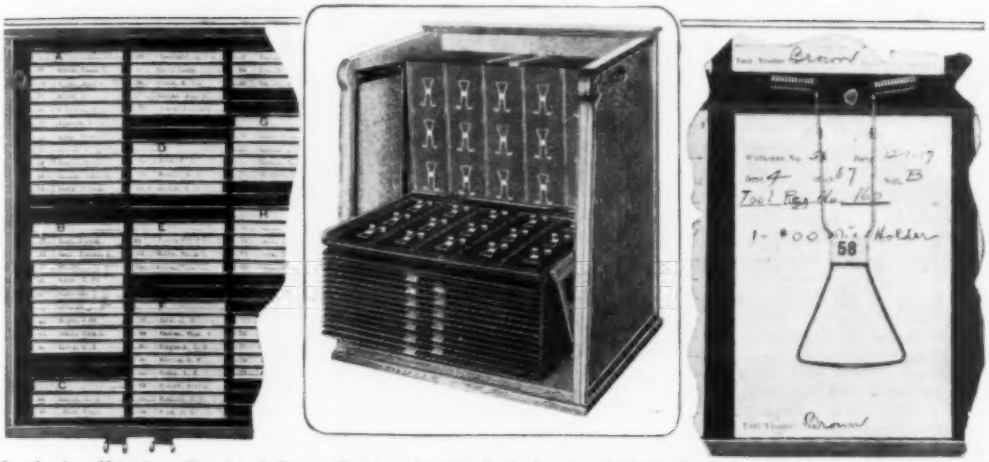
The prize for an overland race which was recently won by 16 Canadian returned soldiers, in competition with several representatives of moneyed interests and a railway, was certain newly discovered deposits of sulphate of potash in the dry bed of Inglebright Lake, Saskatchewan. These deposits may prove to be worth millions of dollars. Their discovery came to the attention of several persons, including the soldiers, at about the same time, and immediately a rush was made to see who could reach them first. The former fighters hastened across the plains by automobile and, arriving on the scene before all others, staked out their claims. Their competitors were only a few minutes behind them, but it is not thought the winners' claims will be contested.

## COAST SURVEY TO HAVE TWO NEW BOATS

So many wrecks have taken place in uncharted Alaskan waters in recent years that soundings are to be made by the Coast and Geodetic Survey in these regions in order that mariners may have more reliable information in selecting routes. For use in performing this task and similar work on the southern Pacific coast, it is announced that two ships costing $400,000 each will be built by the Shipping Board.

## TOOL-RECORD FILE FOR SHOPS PREVENTS CARELESSNESS

With a view to preventing losses due to careless handling of tools in machine shops, etc., a tool-record system has been devised which provides complete information at all times as to the tools in use and those in the stock room. The equip-



Outfit for Keeping Track of Shop Tools: At the Left Is the Alphabetical Index of Employes' Names Showing Their Respective Numbers. The Cabinet in Which the Memorandum Slips are Kept is Shown in the Center, and One of the Spring Clips, with a Slip beneath It, is Pictured at the Right

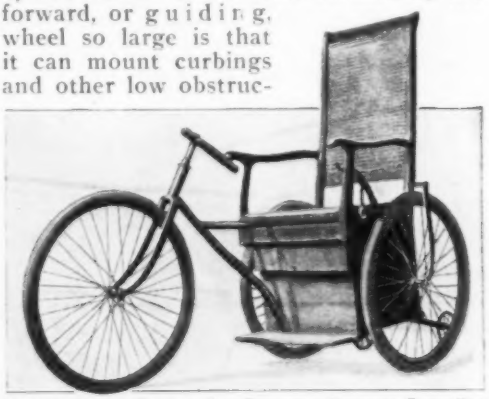
ment used consists of a cabinet having a series of hinged leaves to which spring clips are attached. One set of these clips is numbered to correspond with numbers assigned to the workmen, and the other is numbered according to the numbers assigned to the tools. When a workman procures a tool a triplicate record is made showing his name and number, the number of the tool, and the department in which it is to be used. One slip is placed under the clip assigned to the employe, another under that assigned to the tool, and the third is given to the workman, to be kept in a holder until it and the tool are returned. The file shows at a glance just where each tool is and furnishes a record which reduces errors to a minimum.

## WAR-SAVINGS MOVEMENT ON PERMANENT BASIS

The war-savings campaign has attained such great success in teaching thrift to many persons who were extravagant and wasteful, that the government has decided to put the war-savings movement on a permanent basis. In Illinois, for example, the campaign for 1919 will be under the supervision of the Federal Reserve Bank of the seventh district. What is known as a war-loan board will offer war-savings stamps, together with Liberty bonds and treasury certificates. The stamps for the current year will be blue so that they can be distinguished from previous issues, and in size they will be slightly smaller. Thrift stamps and thrift cards will continue in use as heretofore.

## NEW TYPE OF WHEEL CHAIR IS MOTOR-DRIVEN

An electrically driven wheel chair is a recent invention designed to make invalids more independent of attendants. In a case beneath the seat is a storage battery which drives a motor connected by gearing with the axle, while a lever attached to the left arm gives the occupant full control of the speed. The three wheels in size and design resemble bicycle wheels. The reason for making the forward, or guiding, wheel so large is that it can mount curbings and other low obstructions more easily than one of small diameter.



Wheel Chair Driven by Storage Battery Installed below the Seat: The Front Wheel Is Large in Order That It may Easily Pass over Low Obstructions

¶ Because of the scarcity of shipping facilities for carrying petroleum from certain oil-producing districts in Mexico, an effort is being made to have it shipped to the United States by rail in much greater quantities than heretofore.

## "KAISER" CENTRAL FIGURE IN VICTORY FLOAT

Inspired by victory, many an American early in November found himself suddenly possessed of ability in the plastic art—at least ability sufficient to permit the fashioning of unmistakable effigies of the allied world's archenemy. One such product of the amateur figure makers, shown herewith, depicted the former German war lord holding parts of a broken sword in hands upraised kamerad-fashion. The effigy was made of plaster of Paris, sticks, excelsior, and an improvised uniform, and was completed in five hours.

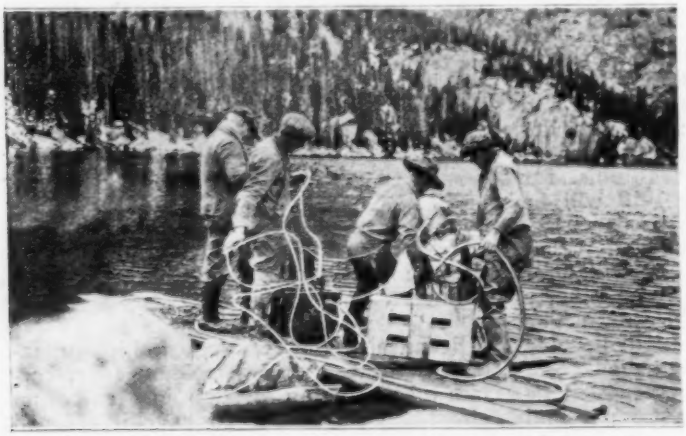
How Enthusiastic Patriots in Mitchell, South Dakota, Celebrated Victory over the Huns: The Figure was Fashioned in Five Hours

## DAMAGED BOAT, WELL LOADED, TOWED TO PORT, BOTTOM UP

To the list of strange happenings at sea during the war may now be added an account of a schooner, loaded with salt herring, which was torpedoed not long since by a German submarine. The owners assumed that the vessel and its valuable cargo were lost. It developed, however, that though the craft was capsized by the torpedo both it and the barrels of fish which it contained were saved and damaged but little. Instead of sinking, the schooner remained afloat upside down, and in that position was towed into a Canadian port. Eventually 80 per cent of the fish were recovered in perfect condition, and placed on the market.

## DIVER WORKS IN RESERVOIR ON PIKES PEAK

Some time ago a valve stem in one of Colorado Springs' reservoirs on Pikes Peak broke off and, as it was 40 ft. under water, it proved impracticable to repair it on account of the high price of divers' services. Recently, however, the city purchased a diving suit in which the superintendent of the water system descended into the ice-cold water and made the repair in seven minutes. Other owners of reservoirs in the region are now making requests for use of the suit to do similar repair work. Probably nowhere else in America is a diver's suit used at such altitude.

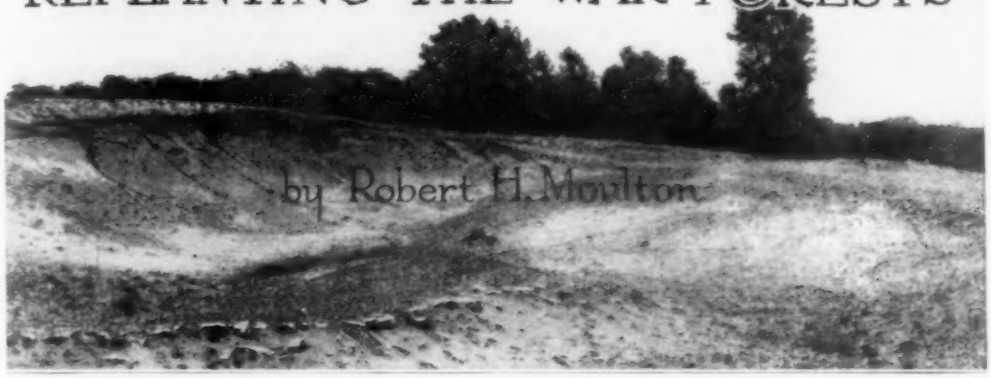


Plunge at High Altitude: Superintendent of Colorado Springs' Water System Descending in a Diving Suit into an Ice-Cold Reservoir on Pikes Peak to Repair a Valve Stem

¶A steel expert, following an investigation, has come to the conclusion that where the phosphorus in malleable cast iron reaches .2 per cent, or more, it has a deteriorating effect.

# REPLANTING THE WAR FORESTS

by Robert H. Moulton



One of the Few "Blowholes," or Regions of Shifting Sand, That Still Remain on an Illinois Farm: Numerous Similar Tracts have been Forested, as for Example the Land in the Background, and in That Way Adjoining Fields have been Saved from Inundation by the Sand

ENGLAND and Scotland are preparing to replant forests which have been cut to provide war supplies. They are not waiting until peace is concluded, but are doing it now. Never before have those countries been so bare of timber. Hunting ranges and sporting grounds have been sacrificed to supply munition factories at home and armies abroad. These forests were neither large nor many, but they were sufficient to tide over the time of peril. The replanting will involve certain changes.

The cutting is not yet all done, but plans for planting new forests are under way. The old forests were primarily ornamental and incidentally useful, but those which are now being deliberately provided for will be primarily useful and incidentally ornamental. This will conform to the spirit of the times after the war. Forests will no longer be planted and protected for the benefit of a few hunters and gentlemen of leisure, but will be made and maintained for the profit of the people as a whole and as delightful places of retreat from the dirt and noise of cities.

The Giant Cottonwood Tree, Self-Sown Decades Ago, Which Suggested to the Owner of the Steadily Enlarging Sand-Covered Tract, That a Large Number of Trees could be Made to Grow in This Soil and So Add to the Value of the Whole Farm

In the United States we are not in so much need of tree planting as they are in the British Isles. We have so much timber left that in most cases we cannot miss what the war has taken. We could fight on for 20 years and still have plenty of most kinds. But there are two kinds of timber which the war demand has greatly depleted, and they are kinds of much importance: locust and black walnut.

These were not abundant when the war began, and the demand has been extraordinarily heavy. The supply is now smaller than it ever was in the past. It would seem, therefore, that it would be good policy to do as they are now doing across the sea and take immediate measures for planting walnut and black locust. If these woods will never again be needed

in war, as we all hope, they can be used in the industries of peace.

There is another point to be considered in the planting of these trees: They can be grown on sandy tracts of land which are now considered of no value, and thus reclaim this land. Still another point, and one of great importance, is the intimate relation that exists between forests and farms. As a matter of fact, the value of trees on a farm can hardly be overestimated.

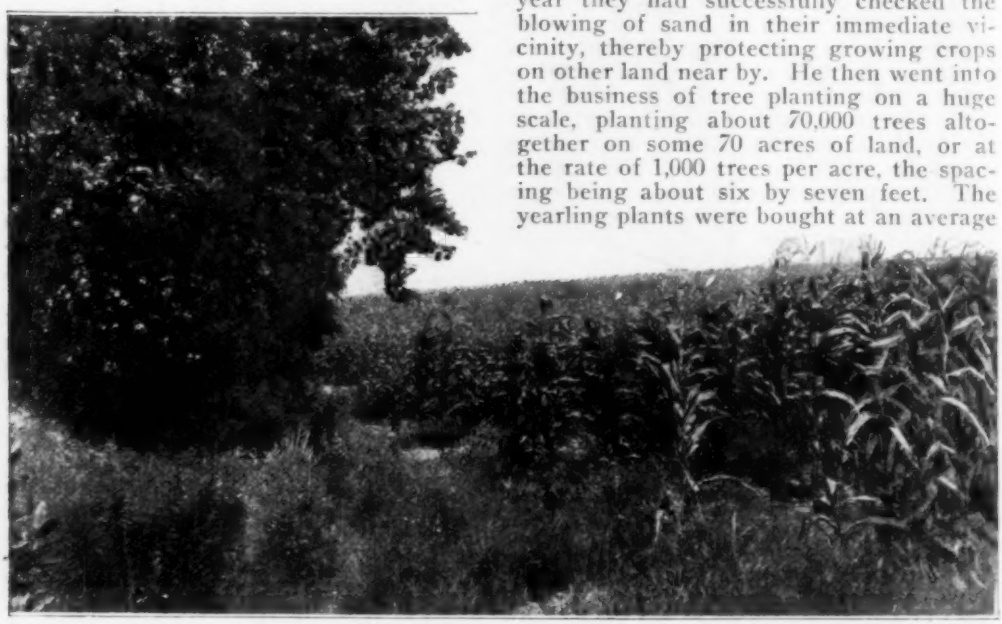
A principle that has been laid down by the wisest observers is that five per cent of the whole area of plains and prairie states should be put into trees. The forest waters the farm. This is a patent fact in all regions where irrigation is practiced; it is not less true in all the rest of the country, although it takes a little investigation to reveal the fact.

An excellent illustration of what can be accomplished in the way of reclaiming useless land through the planting of trees has been carried out during the last six or eight years by a resident of Whiteside County, Ill. In these years he has accomplished the seemingly impossible task of turning some 70 acres of sand, formerly as barren as the desert of Sahara, into a flourishing forest. Nor is that all; for this forest, acting as a sand binder, has been the means of saving other fertile acres from the inroads of the drifting sand, the total result being that the farm has increased several times in value. The sandy tracts, which, before being planted to trees, were practically worthless, are now worth anywhere from $50 to $100 an acre.

This farm lies on the edge of the so-called "bottoms," three or four miles east of the Mississippi River. When in geological ages, the channel of the Mississippi was changed, the sand in the old river bed was blown up on the east side of the river, forming many sandy tracts. In time these tracts became covered with a sparse growth of grass. Then in a dry season the grass was killed, and the sand began to blow about, covering everything in its course. Such was the situation when the present owner came into possession of his farm.

Being something of an enthusiast in afforestation, he determined to attempt the reclamation of the sand tracts on his farm. He was encouraged in the belief that trees could be made to grow there by the presence of one huge cottonwood tree standing almost in the middle of the tract. This tree also suggested certain species, such as black locust and walnut, which would most likely thrive in the sand.

The first year 5,000 yearling trees were planted and in a little over a year they were three or four feet high, and grass began to creep in between. In another year they had successfully checked the blowing of sand in their immediate vicinity, thereby protecting growing crops on other land near by. He then went into the business of tree planting on a huge scale, planting about 70,000 trees altogether on some 70 acres of land, or at the rate of 1,000 trees per acre, the spacing being about six by seven feet. The yearling plants were bought at an average



**This Fine Corn Field has been Saved from Drifting Sand by Planting the Adjoining Tract to Trees, as Shown at the Left**

A Thriving Forest of Walnuts and Black Locusts in the Midst of What Was Once a "Blowhole," Where the Temperature Reached 120° in Summer: Now, in Hot Weather, the Air Is Cool and Moist Because of the Evaporation from the Trees

price of $5 per thousand, and the cost of planting them was relatively small, since two men could easily plant 3,000 trees a day.

The rapidity with which the sand drifted in many places is well illustrated by some of the accompanying photographs which show the original fence posts, set before the tree planting began, almost entirely covered.

One blowhole was left unplanted, merely for the purpose of showing other farmers what can be accomplished in the way of reclaiming sandy tracts of land. This blowhole also shows, in a manner most unmistakable, how the trees serve to lower the temperature. On the day these photographs were taken, in mid-July, a test of the temperature in the blowhole indicated 115° F. (it has been known to go as high as 150°), while among the trees it was only 95°. This difference was due, in part, to the fact that trees drink in and transpire an enormous quantity of water, and this giving-off tempers the dryness of the near-by atmosphere.

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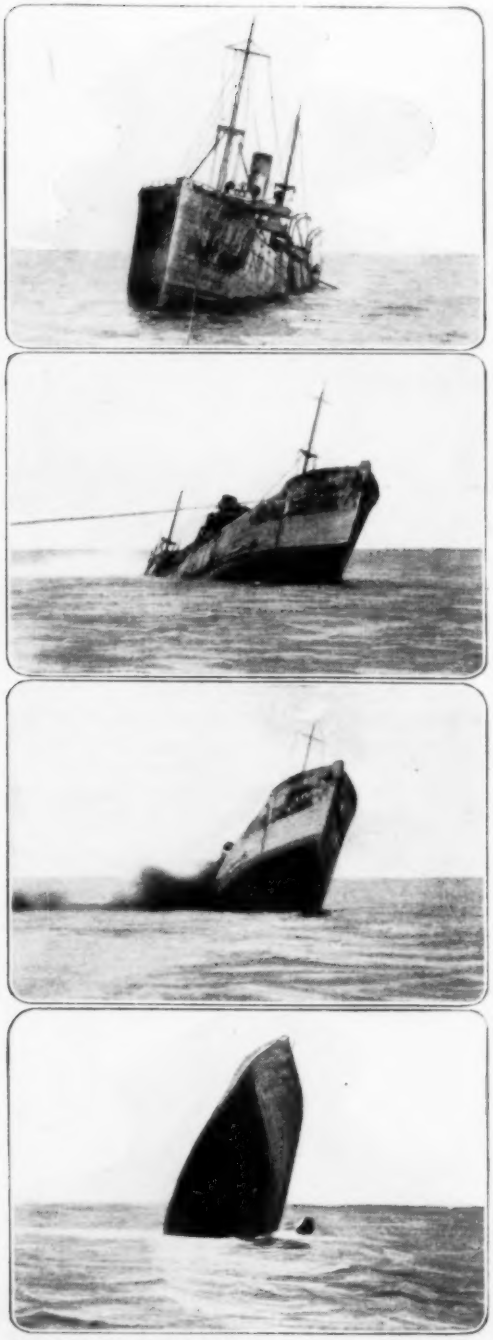
¶ The Japanese government has established certain standards of quality which must be met by all articles in certain lines meant for the export trade. Matches, glassware, enameled ware, hosiery, and braid are now included in these regulations.

## STUMP STOVE CLEARS LAND AT SMALL COST

Stumps on a large plantation in the South have been gotten rid of at small

One of the Sheet-Metal Stump Stoves Used in Clearing a Southern Plantation



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Reading from Top to Bottom, the Pictures Show: 1, the Torpedoed Ship being Towed in the Hope of Reaching Port; 2, Clouds of Steam Rising from the Engine Room, Indicating That the Inrushing Water has Reached the Fires; 3, The Tow Line having been Severed and Smoke Belching Forth; 4, Bound for "Davy Jones' Locker" with Bow High in Air

cost by using stump stoves of simple design. Each consists of a cylindrical jacket, 3 to 6 ft. in diameter, of heavy sheet metal, with a conical hood terminating in several feet of stovepipe. One of the stoves is placed over a stump to be removed and a fire lighted within, access to the interior being had through a door in the side. One stove can be used to burn out three stumps in a day. Since an attendant can care for a dozen or more fires, the cost of clearing the land is not large.

## FOUNDERING VICTIM OF U-BOAT SHOWN IN PHOTOGRAPHS

Another interesting pictorial story of the sinking of a torpedoed merchantman under allied convoy in the Mediterranean Sea, is told by the accompanying photographs. The pictures were taken by a witness aboard another vessel, and give different glimpses of the ill-fated ship in its last minutes afloat. On occasions during the past four eventful years somewhat similar serial photographs have come to attention, but no doubt this is one of the last series of the kind that will be published in many days to come. The pictures show the torpedoed craft from the time it began to settle by the stern, until, with its bow high in the air, it began its final downward plunge.

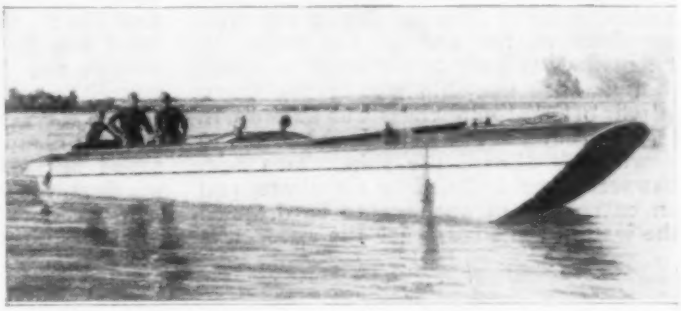
## TO USE GREAT POWDER PLANT IN MAKING CHEMICALS

Officials in charge of constructing the great smokeless-powder plant at Nitro, W. Va., on which the government has been spending $51,000,000, announce that the end of the war does not mean this money has been wasted. The plant has been planned with a view to such a turn of events, so that in times of peace it can be devoted to the making of dyes and chemicals, a field in which the United States is to make a strong bid for supremacy. A force of about 24,000 men is required to operate the establishment at full capacity, which is 625,000 lb. of powder per day.

CAnnouncement has been made by the Medical Reserve Board of the Division of Military Aeronautics of the perfection of a practically nonshatterable substitute for glass, intended to be used in making lenses for airmen's goggles. The material is hard, noninflammable, and may be polished.

## HIGH-SPEED SEA SLED IS FLIERS' LIFE-SAVER

A sea sled, capable of traveling 60 miles an hour, has been placed at the service of the government and already has done invaluable work in rescuing fliers who have fallen into Lake Worth, a body of water in Texas on which the craft is located. Airmen training in the vicinity of Fort Worth are required to do their difficult maneuvering, or "stunting" as it is called, above this lake, 30 miles long, and the sled, manned by a crew of three, follows them about or lies ready to come to the rescue in case of accident. Its high speed has enabled it to reach a number of fallen fliers in time to drag them from the water.



**A Life-Saving Craft for Airmen: The Crew of This High-Speed Sea Sled Watch Fliers Practicing "Stunting" above Lake Worth, Texas, and Hasten to Their Rescue in Case They Fall**

## INGENIOUS METHODS USED IN LAUNCHING SHIP

Serious difficulties conspired to make the launching, some time ago, of the steamship "Beaumont," at Beaumont, Tex., more than ordinarily interesting. The vessel was built on ways laid at the greatest possible angle to the river's shore line. But even this arrangement gave only a 450-ft. stretch of open water. The boat measuring 270 ft. in length, the submerged ways, 130 ft., and shallow water usurping an additional 20 ft., meant that the boat could move ahead only 30 ft. after leaving the ways. These conditions made it patent that the vessel would have to be stopped immediately after slipping from the ways, and were of course given consideration at the outset when the latter were built.

Varied means were employed in solving the unusual problem. The keel was laid with a .625-in. grade and the stern set very low, while the

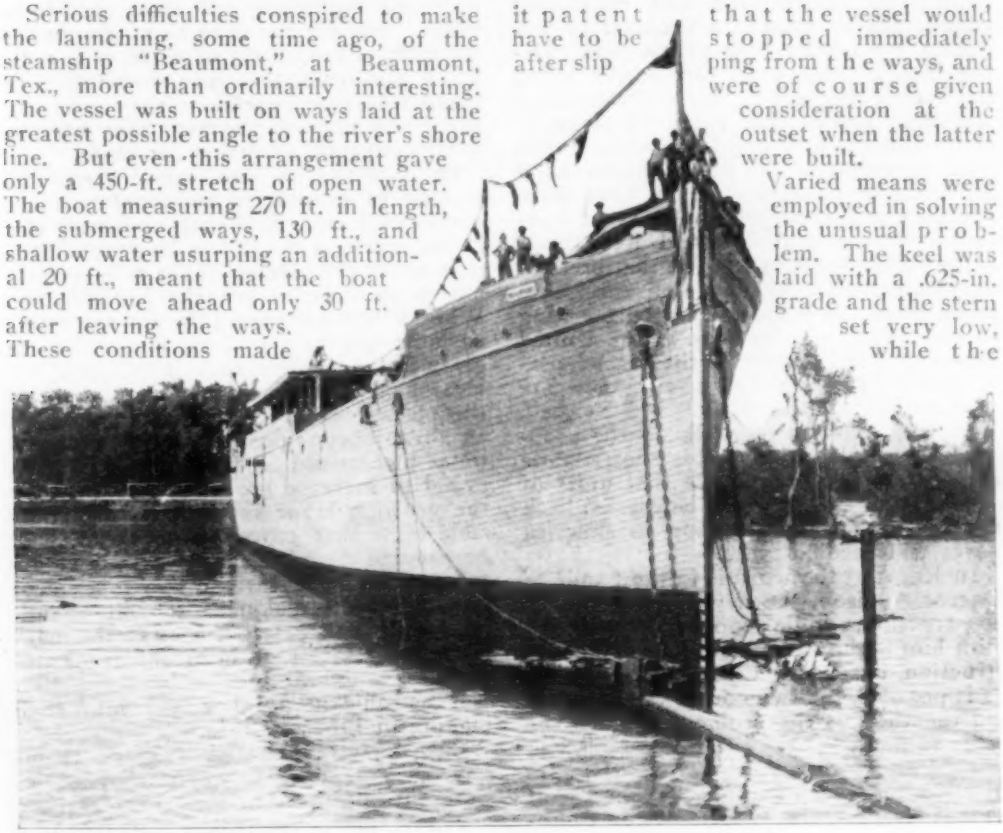


PHOTO BY COURTESY OF MAX HANSEN

**The 270-Foot Wooden Steamship "Beaumont" Immediately after Its Successful but Difficult Launching in the River at Beaumont, Texas**

ways were built with a 12-in. crown. A large live-oak friction brake, with two 6-ft. wheels controlled by heavy steel bands, was made fast to the ship with a 2-in. steel cable. It was designed to be operated through a triple block by 10 men, and intended to slow the ship to a gradual standstill at the end of the ways. A bulkhead was built at the stern to retard motion once the ship was in the water. A pair of two-ton anchors was buried 8 ft. in the ground and the chains connected to a windlass aboard the ship. Two 3-in. hawsers were fastened to the shore, and an extra pair of anchors, to be dropped the instant the boat struck the water, was provided. When the launching was made the boat was stopped at the point previously contemplated. This was not done, however, without some of the plans going amiss in practice. The boat gained the undesired speed of 12 ft. a second in the first 150 ft., and when the brake was applied the 2-in. steel cable snapped, although not before the speed had been materially reduced. The stern bulkhead slowed the vessel still more, and when the anchor chains became taut and were payed out skillfully by the men at the windlass, the stop was made at the desired spot without the necessity of bringing the hawsers into use.

# DISSOLVING A WORLD ARMY

By E. T. BRONSDON

TO return hundreds of thousands of honorably discharged combatants to peace-time occupations and conditions cannot fail to present a problem to any nation, no matter how prosperous. Demobilization, however, can hardly affect the United States, with her newly acquired merchant marine, her extended commercial interests, and her brand-new industrial pursuits, in the same degree as it must those countries which have been ravished and scourged by years of warfare. France and England have their plans well enough in hand so that preliminary rehearsals of the demobilization have taken place. It is too early at this writing to state what will be done in the United States, but it is probable that an adaptation of the same scheme which takes care of Tommy and the "poilu" will be used. With the Yankees there first is the problem of transportation across the Atlantic to be faced; it is probable that units of armies from this side will be carried back slowly so that the situation in America never will become acute.

In England the work is in the hands of Doctor Addison, the new minister of reconstruction, while coöperating closely with him is the French Bureau of Reconstruction, headed by Clemenceau. As far as is possible, the two countries are working together, as the problem is much the same in both.

First and foremost, these countries are considering the case of the scores of thousands of workers in munition factories. Over nine-tenths of these will be released during the next 18 months. In France, war contracts are being rearranged, curtailed, and amended so that some establishments will close each fortnight. The change is to be as gradual as possible, and each set of workers is notified a month in advance to enable them to make whatever provisions they desire in regard to new employment that may be most congenial or fitting for them.

In England, where more men and women in proportion to population are employed in this field than anywhere else in the world, a board has been appointed to care for the placing of the released employes in the civil branches of industry. While it is not expected that all the women now working making shells can be given jobs anywhere near as lucrative, the ideal held up before this new board is the placing of every patriotic worker in an advantageous position. All the peace-time mechanical industries have been urged to increase production to care for the growing labor supply, and it is possible even that government subsidy will be granted certain manufacturing industries which have thrown every resource into munition making. It will be all-important that these get back to the manufacture of looms, farm machinery, automobiles, tractors, presses, and the like, just as quickly as they got into shell making in 1914 and 1915.

But what about the soldiers themselves? The munition workers, of course, were patriotic and deserve consideration, but how much more deserving are the men who went out to give their lives, if need be! The present article will not

consider the case of wounded or crippled men, as theirs is a problem entirely separate. Vocational retraining has to be given them, partial-wage agreements with employers have to be reached for them, and many safeguards and privileges provided that are not necessary for the ordinary workman-soldier.

France is planning to divide the units to be demobilized in several groupings. For the sake of clearness, let us suppose for a moment that the demobilization unit will be a division, approximately 12,000 men.

Of these there will be about 3,000 who will want nothing from the government except honorable-discharge papers. That is, they will be professional men, actors, storekeepers whose wives or families have kept up the business more or less well during their absence, independent farmers, sons of wealthy families who had no occupation before the war and expect none after hostilities are ended, and men for whose services there is a never-failing demand. These will be mustered out as quickly as the necessary formalities of equipment, check, and physical examination are ended.

Second, there is a large class of men, probably 4,000 in number, impoverished by the war. These are cobblers, storekeepers who sacrificed their shops when the call to the colors came, farmers whose dependents have had to use up their little property in order to eke out a living, and other men from similar occupations. Suddenly cast adrift, these men might be able to make some sort of bargain with the world, but it is almost a certainty that the vast majority would be unable to attain the same standard of life which they left.

The government owes them a certain amount of equipment. France herself cannot afford to lose these useful members of her communities, or even to have them drop hopelessly in the scale during the difficult period of readjustment and reconstruction. What France plans to do with these men simply is this: supply each man with the tools of the trade, the tiny store, the small farm, or whatever it was that he used in making a living. Wherever it is possible, the same shop, store, farm, or what not, is to be restored, together with an amount of capital sufficient to meet immediate expenses. In most cases, so thrifty and businesslike are these bourgeois, that at a cost to the government of only six or seven hundred francs they feel themselves wholly rehabilitated. Considering the fact that France will have several hundred thousand men in this class, it is plain that the bill for reconstruction will be huge. It will be worth while, however. The strength of France is in her solid, thrifty, honest bourgeois class.

Third and last is a class comprising roughly 5,000 men. Here are the clerks, the skilled mechanics, the plumbers' helpers, the salesmen, the vineyard hands, the taxi drivers, and all sorts and kinds from various types of employment. Before the war, these men worked for wages. After the war, most of them will do the same. If they are released in one great body, they will act upon the labor supply and the wage scale just as the released printers might have acted in the New York City instance. Not only will many of them be forced to work at low wages, but hundreds and thousands will not find the sort of employment to which they are best adapted. Many will find no employment at all for months. Starvation and want will ensue, and France has had burden enough in this war without loading herself with a nonproductive element of enforced beggars. This says nothing of the rights of the men themselves.

This is the way France is going to provide for them. From Pyrénées-Orientales to Pas de Calais, from Finistère to Haute Saône, are 34 French provinces. Each has its several departments. Each province is to have its director of employment. Below him in each department is to be a subdirector with his staff. The business of these officials is to be the cataloguing of the needs of commerce, industry, and the trades in respect to men. Also they have the task, acting as agents of the government, of urging forward production in all centers, so that a greater number of men can be absorbed.

These 5,000 men of the division will be catalogued according to the jobs they desire. Then they will be split into 34 sections, corresponding to the sections from which they come or to which they wish to go at the end of their military service.

Suppose, then, that a call comes from Gascogne for 620 clerks, stenographers, and bookkeepers.

The 406 (from our hypothetical division) from this province who had signified their desire of accepting these positions would be sent on immediately. The 214 vacant jobs thereupon would be offered to men wishing similar places who otherwise would have to wait the call from their provinces. Many single men with

an adventurous spirit would accept, thus getting back into civil life weeks ahead of the time, perhaps, for which they were scheduled. Also the labor demand would be equalized all over the nation.

The same scheme is to be followed in respect to all forms of employment. Where men have experience in more than one line, or have no experience whatever, considerable latitude will be allowed them in their choice. The main point is that all will be taken care of; every French soldier who wants it will have his job waiting for him at the time he secures his discharge from the army. This means that France is going to merge gradually from being the most warlike of nations to being the same peaceful, prosperous, and thrifty country she was before the Germans broke through Belgium.

England's ground plan of demobilization is similar, though it does not go so deeply into the job-getting feature. With the English, however, the same thoroughness that characterized the retaking of Kemmel Hill—of which it is said that five "full dress" rehearsals were given behind the lines before the actual attack—creeps into the details of demobilization. England already has actually rehearsed the processes of returning her troops to their homes, and knows positively that everything will run smoothly.

At a time when the United States was not even thinking seriously of the end of the conflict—Sept. 20, 1918—the War Office, in conjunction with the Labor and Reconstruction ministries, "demobilized" a Cornwall (English), a Radnor (Welsh), and an Aberdeen (Scottish) regiment just for practice!

Of the men who took part in the mummery, one-half had "come direct from France," while the other half was supposed to have been transported from camps in England. Those who were tagged "from the train—hungry" were fed, and housing accommodations were provided at the dispersal stations.

The men, naturally, were in full equipment. First they were assembled in parade formation, and were inspected generally by the king and queen. Next they were marched to the Q. M. store, where a sand bag was doled out to each. In this he put all his private belongings, and the bags were officially inspected.

Then he turned in his rifle, and those who had "come from France" added their steel helmets and gas masks. Whatever was missing had to be accounted for then and there. If the missing article was important, as a rifle, for instance, the platoon officer was called in to corroborate the soldier's story. In case this corroboration was lacking, or unsatisfactory, the man's dispersal certificate was debited with an amount to correspond.

The men left the Q. M. store with only their uniforms, overcoats, greatcoats, and sand bags. Each man was told that he might keep his uniform and light overcoat, but that his greatcoat must be returned at the conclusion of his furlough. He was told also that for 28 days he would be allowed to wear the uniform day and night if he wished. After that time it was permissible for him to don it only on special occasions.

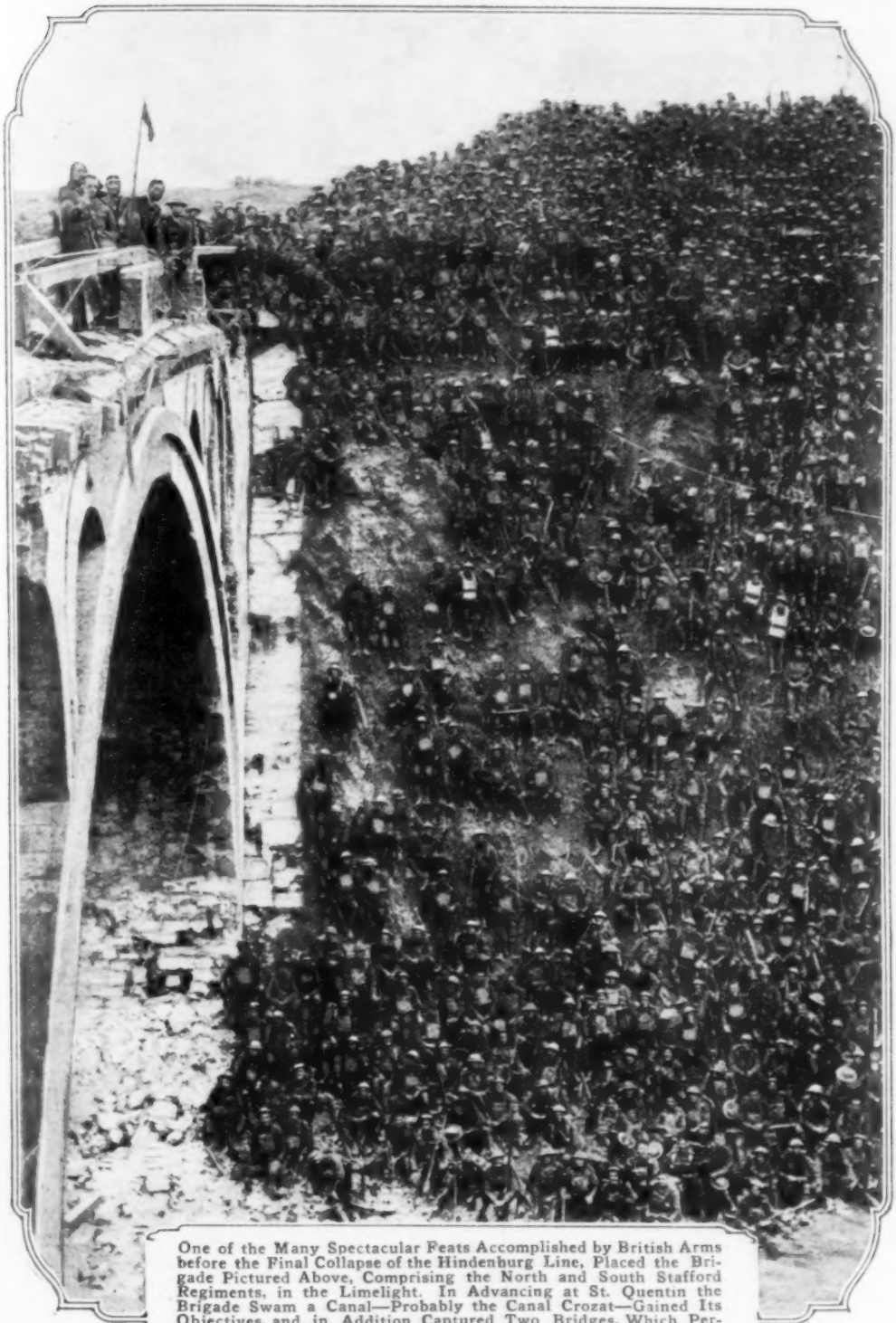
Then each soldier was "documented"—as the English have it. He passed through a number of fearfully thorough offices. Here he obtained his out-of-work certificate which is in reality an insurance policy, granting him an income each week for four weeks. In addition to this, he received in exchange for his dispersal certificate another paper, called a protection certificate, which he took with him on his "four-week furlough." This entitled him to a sum in advance immediately, the remainder of his deferred pay, and whatever additional bonuses the government might vote him. These sums were made payable at any English, Scottish, or Welsh post office on presentation of the certificate.

He received a label for the return of his greatcoat at the conclusion of his furlough, papers giving a description of his military service, and a railway warrant for his return journey, together with his employment-agency certificate to be used on reaching his home community. The railway warrant was put in a plainly marked envelope, which told him exactly where and when to catch his train home, in order to be in company of comrades going the same way.

There the "demobilization" ended. Except for the business of job getting, the machinery for which had not been organized fully at that time, the man was a civilian again. The moment each of the men in the three regiments reported to the station master at each of the railway depots, he was told to report again to his regiment. Then, presumably, he went back to the western front.

Now it is all over. The plans of France and England soon will be in full working order. May everything go off as smoothly in actual practice as it did in the dummy demobilization!

# BRITISH BRIGADE SWIMS CANAL UNDER FIRE



One of the Many Spectacular Feats Accomplished by British Arms before the Final Collapse of the Hindenburg Line, Placed the Brigade Pictured Above, Comprising the North and South Stafford Regiments, in the Limelight. In Advancing at St. Quentin the Brigade Swam a Canal—Probably the Canal Crozat—Gained Its Objectives, and in Addition Captured Two Bridges, Which Permitted the Artillery to Move Forward

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**TRIUMPHANT ENTRY OF BRITISH TROOPS INTO LILLE, LONG UNDER HUN'S HEEL**

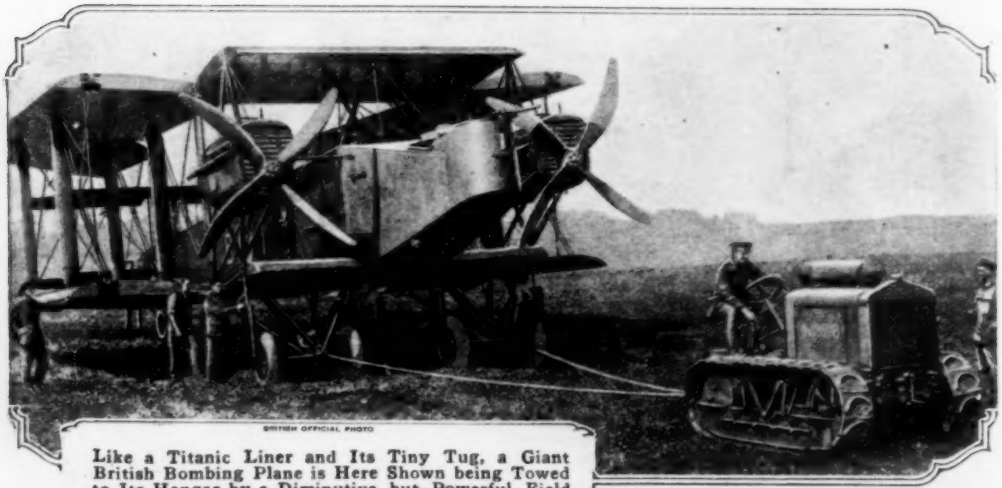
The Inhabitants of Lille Went Mad with Joy When the Tide of War Swept the Hun to the East and Brought British Troopers into the City Close on His Heels. For Four Years the Citizens had Suffered Humilities That Only the Hun can Inflict. The Picture Gives an Example of How the Roads Leading to the City, and the Streets in It, were Lined with Liberated Inhabitants Who Welcomed "les Anglais"

# SOME VILLAGES WHIPPED HUN MUST REBUILD

It Is Easier to Destroy Than to Build, So the Task That Now Faces the Hun Is No Inconsiderable One. Villages without Number have been Demolished, Even as the One Pictured Above, and These the Vanquished Foe must Restore

This Photograph, Taken Shortly before the Cessation of Hostilities, Shows a Procession of French Tanks Wending through the Ruins of a Reconquered Village in Pursuit of the Retreating Hun. The Destruction Is Not So Complete Here, for at This Time the Allies Were Too Close upon Them

PHOTOS FROM FRENCH PICTORIAL SERVICE



BRITISH OFFICIAL PHOTO

Like a Titanic Liner and Its Tiny Tug, a Giant British Bombing Plane is Here Shown being Towed to Its Hangar by a Diminutive but Powerful Field Tractor. Note How the Wings of the Plane are Folded

BRITISH OFFICIAL PHOTO
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The Volunteer Member of the Women's Royal Naval Service Pictured at the Side, Is Engaged in Instructing British Rookies in the Use of Gas Masks. From the Outset of the War, British Women Took Conspicuous Parts in Activities at Home and Abroad

BRITISH OFFICIAL PHOTO
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British Soldiers in the Region of the Somme Drilling for Water: The Cylindrical Device Shown in Use Is a "Bailer" Employed for Removing the Creamy Chalk Sludge from the Bore. The Photograph was Taken While the Cylinder was being Emptied

BRITISH OFFICIAL PHOTO
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The Tanks in This Grim Procession, Advancing to Attack the Hindenburg Line, are Carrying, Rolled on Their Backs, Heavy "Mats" That Provide Traction When Slippery Clay Bogs are Encountered

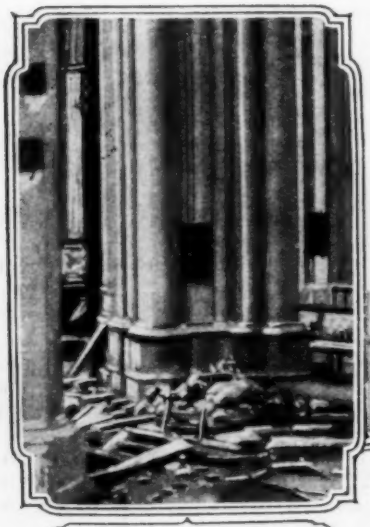
COPYRIGHT, 1918, BY PUBLIC INT

The View Presented at the Left, Depicting American Operations at the Front, Shows the Destruction of a Railway Bridge. The Double Ladderlike Structure Upright in the Middle of the Picture Consists of Two Sections of Track Blown into the Air by the Explosion

FRENCH OFFICIAL PHOTO

Close Glimpse of a French Artillery Battery in Action Shelling Hun Positions in Alsace: The Projectiles, It will be Observed, are Passed from a Truck to the Gun by a Small Crane, Thus Eliminating the Necessity of Handling the Heavy Shells Manually

# MEMENTOS OF WAR "MADE IN GERMANY"



BY COURTESY OF L'ILLUSTRATION

After Cutting the Holes, the Hun did Not Have Time to Conceal Bombs in the Hollow Pillars of the Saint Quentin Basilica

BRITISH OFFICIAL PHOTO

Gas-Proof Portable Pigeon Loft Captured from the Enemy during the Last Days of Hostilities: Tommy is Shown Demonstrating How Messages were Attached to the Birds When the Air was Poisoned

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"Jock, the Hun," Shown at the Right, Is a Prisoner of War. He was Wounded in "No Man's Land" and Captured After He had Tossed Grenades into a French Trench, So the Story Goes

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Yankee Mechanics Overhauling Machine Guns Taken from the Hun in the Final Drive: Enough Ammunition was Captured with the Weapons to Enable Them to be Put in Service. The Soldier at the Right Wears a Helmet "Made in Germany"

## LARGE PEDESTAL TIMEPIECE ORNAMENTS MARKET PLACE

A handsome pedestal clock, 35 ft. high, constructed of reinforced concrete, has been erected in the center of the Los Angeles Terminal Market. The four 6-ft. dials of the big timepiece are illuminated from within at night, and above each is a panel containing advertisement space for the association which provided and will maintain it. The works are wound by electrical means, and any variation in their operation is automatically corrected. The turning on and off of the lights at stated hours is also automatic.

The single column supporting the clock proper is adorned with sculptured fruits, and on the four sides of it hang ornamental lights.

A 35-Foot Pedestal Clock of Distinctive Design Which has been Erected in the Center of the Los Angeles Terminal Market

## BUILD GREAT STEEL PLANT IN MANCHURIA

A big industrial project, indicative of the awakening in the Orient in which the Japanese are taking a leading part, is a steel mill which is being built in Manchuria by the South Manchuria Railway. The undertaking has been hindered to a degree by the great rise in price of materials, but nevertheless two smelting furnaces, having an annual output of 150,000 tons of pig iron, are being constructed. In the extensive regions from which the iron ore is to be procured, whole hills, it is said, are made up of the raw material and the mining operations can be carried on with great ease. For some time the work will consist of digging away these hills, beginning at the top. Extensive preparations are under way for housing officials and employes. Quarters with a capacity for 250 single men have been constructed, and a development company has erected several hundred houses for men with families. In laying out the site for the new town separate residential quarters have been provided for the Japanese and Chinese.

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Officers of the North West Mounted Police report the discovery of several fairly large lakes and a number of rivers in northern Canada during a circuit patrol journey lasting nearly a year. Their route extended from Baker Lake, at the head of Chesterfield Inlet of Hudson Bay, northwest to Kent Peninsula and return via Gordon Bay and Aberdeen Lake. Lake Perry, named for a commissioner of the force, is the largest of the lakes found.

## ACETONE MADE FROM CARBIDE AND PACIFIC KELP

As one result of the war, two interesting sources of acetone and acetic acid have been brought to attention. A Canadian firm was requested by the British government to experiment with calcium carbide as a raw material for the production of acetone. Within a short time a process was developed that ended in the plant manufacturing more acetic acid, it is said, than any other firm in the world. The method, briefly, consists in the production of acetylene from calcium carbide, and acetaldehyde from acetylene. Then by oxidizing the aldehyde, acetic acid is provided.

On the other hand, a large powder company established a plant near San Diego for the extraction of acetone and potash from kelp. The establishment is the largest of its kind ever developed. It covers 30 acres of ground and employs 1,000 men. In 1917 about 24,000 tons of kelp were harvested monthly.

## HEAVY CHAIN IS MADE RIGID BY TERRIFIC STRAIN

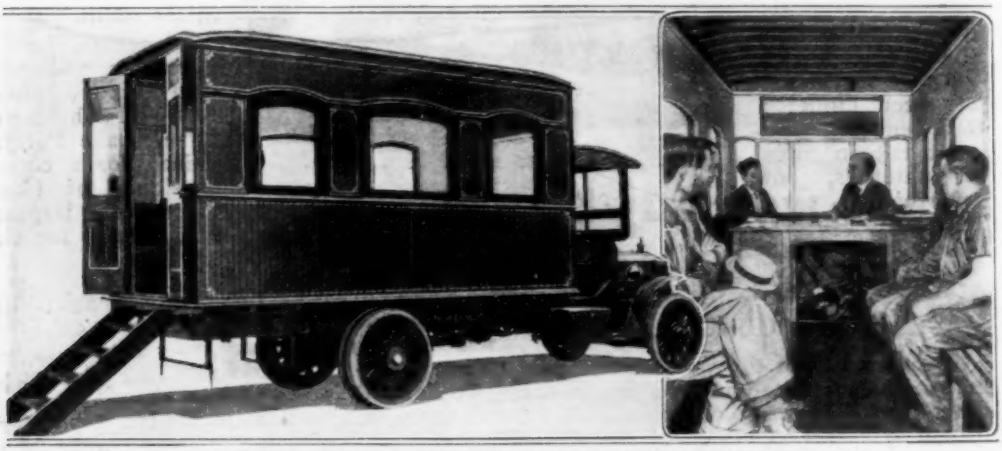
After a heavy chain had been used as a tow line, in pulling a large artillery tractor from a quag mire into which it had slipped, it was found to be rigid. The terrific strain to which it had been subjected, so stretched it that its links gripped each other firmly and gave it the character of a linked bar. When placed on end, it was able to support itself. Gripped at the middle and held overhead, it bent only slightly.

Two Views Which Clearly Show the Rigidity of the Chain After It had been Used in Pulling an Artillery Tractor Out of the Mud

## PARIS-TO-CHANNEL WATERWAY MAY BE CONSTRUCTED

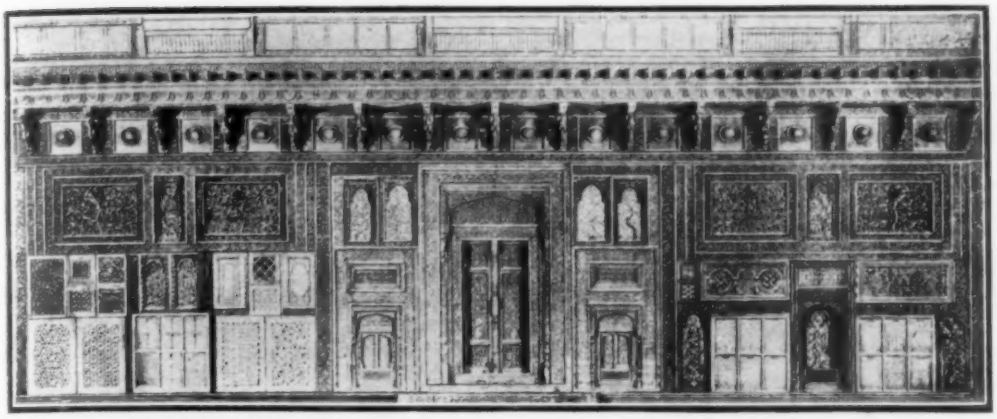
Construction of a canal to give Paris direct communication with the English Channel at Dieppe is receiving serious consideration. The plan is by no means a new one. It was originally suggested in 1694 and has since been reproposed on several occasions. The congestion of traffic on the Seine makes the project one of considerable importance at this time. According to the plans that have been prepared, the waterway will accommodate vessels of about 1,400-ton cargo capacity. It will be approximately 102 miles in length, as compared with the Seine's devious route of some 219 miles. Tracks will be laid parallel with it so that barges may be towed by electric locomotives.

¶On October 27 when the rest of the country moved the clocks ahead one hour, the timepieces in Detroit, Mich., with the exception of those in the post office and railway stations, were not changed. Instead it was announced that on that day the city would adopt eastern time in place of central time.



### MOTOR TRUCK IS EQUIPPED AS EMPLOYMENT OFFICE

As one means of obtaining a sufficient number of workers in spite of the scarcity of men, a large automobile-manufacturing concern has equipped a large truck as a branch employment office. This car frequents the districts where workmen are to be found and enables them to learn all about prospective jobs, and to hire out if they desire, without journeying to the plant. It is entered by a removable set of steps installed at the rear and is furnished with a regular office desk, chair, and benches for eight. Pipes supplied with water heated by the engine keep the interior at a comfortable temperature in winter.



PHOTOS BY COURTESY OF THE JOHN HERRON ART INSTITUTE, INDIANAPOLIS

**General View of a Magnificent Screen Recently Acquired by the John Herron Art Institute at Indianapolis: The Panels, Cornice, Door, and Windows Composing This Collection Are Specimens of the Finest Carving of India. Not a Little of It is Done by Young Children Whose Training Begins before Their Teens**

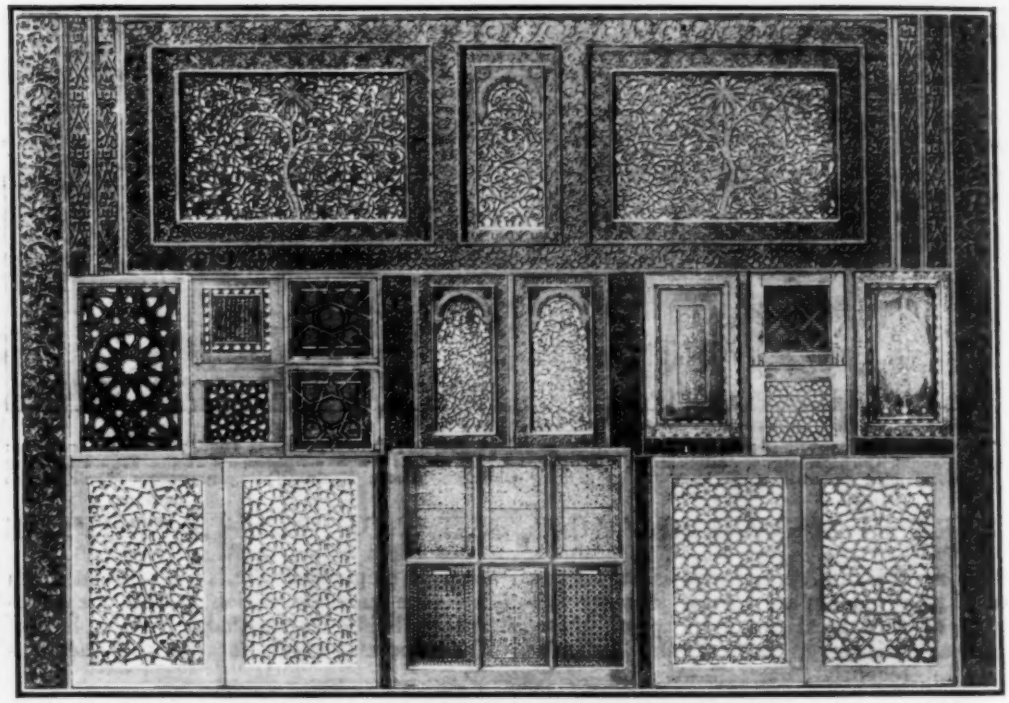
## SCREEN SHOWS AMAZING SKILL OF INDIA'S CARVERS

A magnificent screen, consisting of several hundred square feet of carving typical of the finest work in wood, metal, stone, and ivory, to be found in India, has recently become the property of the John Herron Art Institute at Indianapolis, after having been on exhibit there for some time. The various panels, of which many are originals and others copies made by native workmen, are wonderful evidence of skill which occidental craftsmen have not attempted to equal.

In the center of the screen is a large door with windows on either side, brought from Adoki Province, India. Extending the full length of the display, near the top, is a delicately adorned cornice supported by carved elephants. This was taken from a house in India which was in the process of being dismantled. To the left of the door and windows are two panels inlaid with ivory, which at first glance have the appearance of being open-work carving. At intervals along the bottom, in frames containing six panels each, are exquisite examples of pierced-brass work.

**Detail of the Cornice, Which is Supported by Carved Figures of Elephants: This Costly Piece of Ornamentation was Secured from a House in India That was being Dismantled**

The carvers begin learning their trade when as young as three years old, and when from eight to twelve years old are often as skilled as adults. The most elaborate designs are wrought without any patterns other than rough sketches. The woodworkers sit on the ground and hold the wood with their feet. This enables

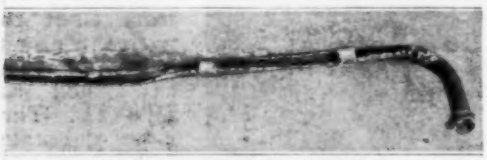


A Close View of a Portion of the Screen, Which Gives Some Idea of the Extraordinary Delicacy of the Designs: The Six Small Panels in the Center of the Bottom Row Are of Pierced Brass. Most of the Others Are of Wood

them to use both hands and often both feet in guiding their tools, and to put their whole weight on them where needed. The bringing of every muscle into play results in a cleanness and directness in cutting impossible in bench work.

## EXTENSIVE RUPTURE CAUSED BY HIGH INDUCED VOLTAGE

Extensive damage was done recently when a 500-volt elevator circuit was "shorted" because a 100-ampere switch was opened while under heavy load. The high voltage induced entirely destroyed



The High Voltage Induced by the "Shorting" of a 500-Volt Elevator Circuit, When a Switch was Opened under Load, Ruptured Six Feet of Conduit as Shown Herewith

the switch, its metal cabinet, and the cutouts, and ruptured six feet of conduit, shown in the accompanying illustration, and insulation on 140 ft. of wire.

## LARGE DRY DOCK AT QUEBEC NEARLY READY FOR USE

Quebec's new dry dock, which is one of the largest in the world, is practically complete. It has been under construction for the past four years. The structure is situated on the south bank of the St. Lawrence River and has a length of 1,150 ft. and a breadth of 120 ft. It is divided into two compartments, the inner of which is 650 ft. long. A floating caisson closes the interior entrance, while a rolling caisson has been provided for the outer one. Although four hours may be required for filling the dock, its pumping equipment, designed to deliver 6,300 gal. a minute, is expected to empty it in about two and a half hours.

¶ The soldiers who remain on duty in France and Belgium this winter should have no difficulty in keeping warm, for the forestry section of the American forces has promised to have ready for delivery 1,000,000 cubic meters of firewood. This is sufficient to make a woodpile 1 yd. wide and 1 yd. high extending from Paris to Berlin.

## WOODEN SHIP COMPLETED IN RECORD TIME

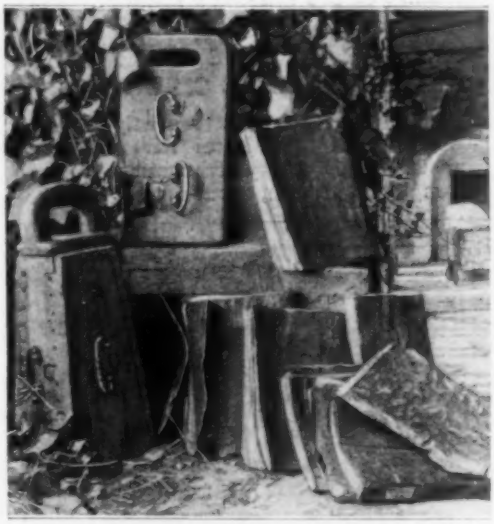
By completing a wooden ship of 4,000 tons, dead weight, from keel to water in 17½ working days, in a shipyard in Aberdeen, Wash., the builders claim that a world's record has been established for both wooden and steel ships of this type and tonnage. The concern has its own sawmill in the yard, so that considerable time is saved by cutting the timbers on the premises. More than 2,000 men have been employed in three shifts in the yard, and for a time, in response to an appeal for more help, over 100 local business and professional men went to work at shipbuilding after business hours.

## INDIAN LOG RIDERS BECOME REAL ACROBATS

To one unfamiliar with life in logging regions the skill of the lumbermen who handle logs in the water is truly astonishing. Something of the dexterity required of them is indicated by the accompanying photograph of two Indian river men standing upright on a log and paddling their way across a wide expanse of water. It must be borne in mind that the slightest impulse will spin a "craft" of this sort at high speed, and extraordinary agility is needed if the riders are to keep out of the water.

## PRECIOUS OLD VELLUM BOOKS IN CALIFORNIA MISSION

Many travelers to the Pacific coast are surprised to find in that region, commonly considered "new," several Franciscan



**Priceless Records of the Early Years of the California Missions, and the Old Iron-Bound Case in Which They are Kept: This Picture was Taken at San Juan Capistrano Mission**

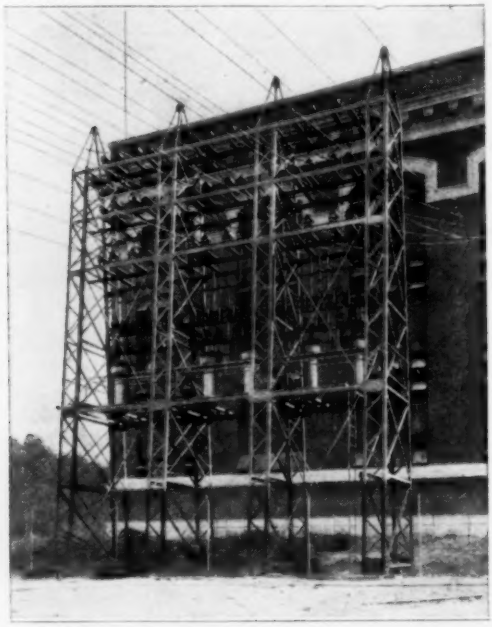
monasteries dating back to prerevolutionary days, and preserving with the greatest fidelity the atmosphere of medieval times. Within their walls are vine-

**A Balancing Act Which Rivals the Feats of Circus Performers: These Indian Logging Men are Paddling Their Way across a Wide Stream on a Log Which will Spin at High Speed the Instant Either of the Two Places His Weight Unevenly. Spikes in the Shoes Give the Men Sure Footing**

covered cloisters, secluded walks, and musty libraries containing manuscripts of time-yellowed vellum. Some of the most interesting of the latter are shown herewith, being the early history of the California missions. They were written by the hand of the mission's founder.

## ANCHOR TOWERS CARRY SIX THREE-PHASE CIRCUITS

Two anchor towers recently erected either side of the Miami River at Dayton, Ohio, to carry transmission lines across that stream, combine a number



**Anchor Tower at One End of an 850-Foot Span of Transmission Lines Extending across the Miami River at Dayton, Ohio: The Structure Carries Six Three-Phase Circuits of 6,600 Volts**

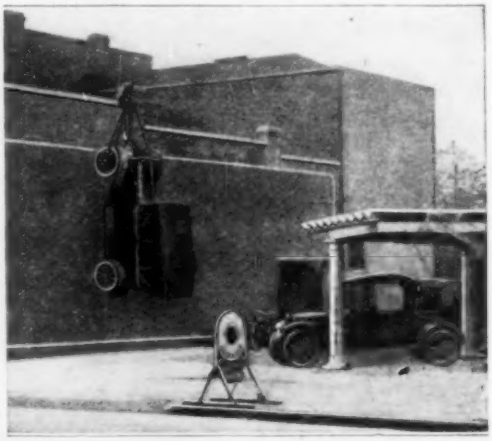
of features of interest alike to the amateur and the expert electrician. The span which the towers support is 850 ft. long. The structures carry six three-phase circuits of 6,600 volts, and above them, attached to the tops of the steel frames, are four grounded conductors of copper-clad wire. The wires of each three-phase circuit are strung one above the other, and each circuit is protected by choke coils, and electrolytic lightning arresters. The latter are said to be the first three-phase arresters of this outdoor type which have been produced. A steel stairway and a substantial platform are provided for the safety and convenience of the man charging the arresters.

## AEROPLANES SWARM LIKE BEES OVER CALIFORNIA CITY

During the fourth Liberty-loan campaign Los Angeles witnessed one of the most spectacular aerial demonstrations so far enacted in America. A remarkable fleet of 115 military aeroplanes soared above the city, dropping Liberty-bond "literature" and executing graceful evolutions high above the central section of the city. The craft approached from the flying field at Riverside at an elevation of about 5,000 feet and suddenly bore down on the city like a swarm of bees, the droning of their unmuffled motors roaring like the surf on a rocky coast. Only one of the planes had to make a forced landing. At an altitude of about 3,700 feet above the business district, it developed engine trouble. It glided easily to a suburban district and landed safely in an open field. It is interesting to note that in flying approximately 94 miles, the 115 machines consumed 3,000 gal. of gasoline.

## CAR LITERALLY "FIXED UP" ON SIDE OF BUILDING

Workmen for an auto-sales concern who are on good terms with their employer, recently took literally the latter's instruction regarding his car, to the effect that they should "fix it up," and hung the automobile well up on the outside of the building. In view of the fact that it was a Halloween prank, the owner took the joke good-naturedly and agreed to pay the penalty demanded for bringing the car down, namely a turkey dinner on Thanksgiving Day.



**The Position in Which an Automobile Dealer Found His Own Car After He had Instructed His Employes to "Fix It Up" for Him: The Order was Given Just before Halloween**

# THOUSANDS SEE AIRMEN FROLIC ON LONG ISLAND

Speed Contests Ran Riot at Belmont Park Recently When an Aviation Carnival was Held for the National Aeronautic Committee. A Sidecar Relay Race Was One of the Exciting Events That Aroused Much Enthusiasm. The Picture Above Shows the Winner, at the End of a Lap, Leaping from One Machine to Another

The Program Included Athletic Contests of Numerous Kinds Which were Meant to Show the Physical Trim of Men in the Aviation Service. Among These Were Standard Track Events, Games Such as Pushball, and Various Exhibition Contests Like the Novel "Chariot" Race Pictured Above and Participated In by Teams of 10 Men Each

Approximately 40,000 Persons Witnessed the One-Sided Race between Louis Chevrolet in His 135-Horsepower Frontenac Speedster and Lieutenant E. C. Meaney Flying a Thomas-Morse Scout Plane. The Latter Easily Gained and Held the Lead. In Attempting to Land in the Infield, However, He Suffered a Slight Mishap That Damaged the Machine but Left Him Uninjured

PHOTOS BY EDWIN LEVICK

## MANCHURIAN SOY-BEAN CAKE SHIPPED TO EUROPE

With the production of many commodities far below normal in Europe, the allies in some cases have gone to the corners of the earth to replenish their stores. The demand for soy-bean cake is a case in point. Soy beans are a principal product of Manchuria, and in recent months tons of the big round cakes made from these beans have been shipped from that remote land to Europe, for use as stock feed.

**The Objects Piled on the Wharf in This Port of Darien, Manchuria, Formerly the Russian Dalny, Are Not Automobile Tires, as One Might Suppose, but Soy-Bean Cakes**

## COMMENCE DRILLING FOR OIL AT CHESTERFIELD, ENGLAND

It may be surprising to many persons to learn that the first organized attempt to establish oil wells in the United Kingdom was launched only three weeks before the cessation of hostilities. In mid-October drilling was begun on the estate of Lord Hartington near the village of Hardstoft, six miles from Chesterfield. Other operations were expected to be started early in November in the same locality. It was reported that 40 American drillers with machinery were ready to begin work at seven different sites selected near Chesterfield, and that three additional locations were being sought.

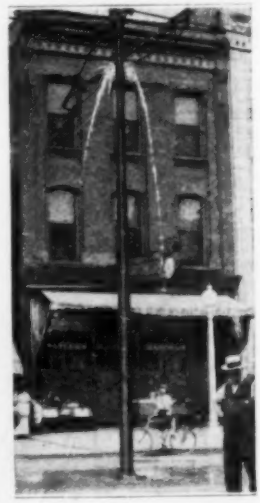
¶What was perhaps the strangest task for which steam shovels ever were used was the digging of graves in certain cemeteries in the East for victims of Spanish influenza, who were so numerous that there were not enough shovelers available to make the graves.

## ACCIDENT-PROOF MINES MADE IN LARGE QUANTITIES

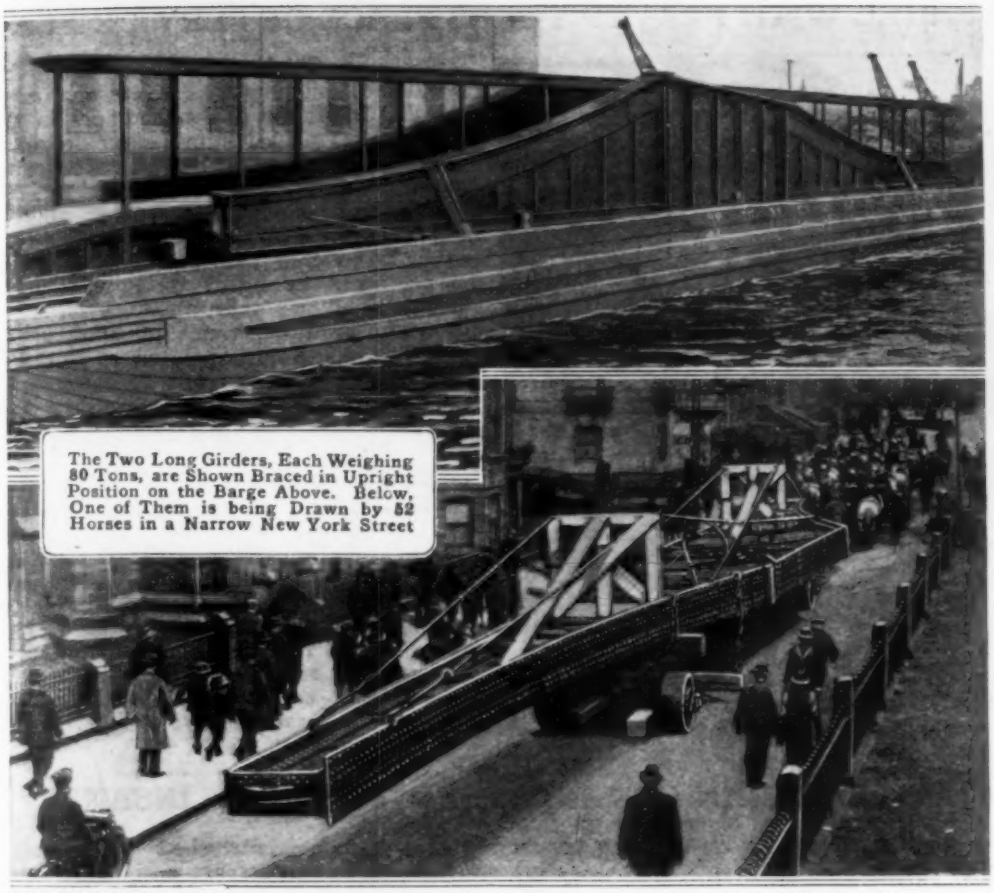
Wonderful progress in the production of mines has been made by the Navy Bureau of Ordnance since the beginning of the war, the present daily output being approximately 1,000 mines. Equally marked improvement has been made in the design of these instruments of destruction which have proven a terror to the submarines. They are regarded as among the safest mines in the world to handle, as is demonstrated by the fact that there has not been an accident in transporting or placing them. They are provided with an internal apparatus which renders them harmless, if they break away from their moorings, and causes them to rise to the surface so that they can be easily disposed of.

## TROLLEY POST BECOMES A REAL FOUNTAIN

Persons passing a certain point on one of Chicago's much-frequented streets were astonished recently to see two streams of water issuing from near the top of an iron pole which supported a trolley wire. Apparently a water main beneath the hollow pole had burst and the water from it rose in the upright support until it overflowed near the top.



¶The eclipse of a few weeks ago was in all probability the first event of the sort which has been observed from an aeroplane. At that time a flight and an observation—the latter not strictly scientific of course—were made at Port Sill, Okla.



The Two Long Girders, Each Weighing 80 Tons, are Shown Braced in Upright Position on the Barge Above. Below, One of Them is being Drawn by 52 Horses in a Narrow New York Street

PHOTOS BY EDWIN LEVICK

## LONG, HEAVY PLATE GIRDERS HAULED IN GOTHAM STREETS

Two 80-ton plate girders, each 136 ft. in length, were recently hauled through the streets of New York to the site of a viaduct, now under construction, which, when completed, will carry Park Avenue across Forty-Second Street. The massive structural members were removed from a barge and separately loaded on heavy trucks. They were moved, one at a time, to the building site by 52 horses under the control of 28 drivers.

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## CARVING MODELS OF BIRDS IS SAILOR'S HOBBY

The hobby of a widely traveled sailor who has now given up life on the sea is the making of realistic wooden models of birds which he has seen in various parts of the world. He has a collection of over 200 models, each painted in colors so lifelike that at a short distance they cannot be distinguished from real birds.

A Retired Sailor and a Few of His 200 Hand-Carved Models of Birds Which He has Seen in Various Parts of the World

The carver has also developed great skill in imitating the songs of these birds.

## PANEL WITH PRAYER TAKES PLACE OF SERVICE FLAG

**Glass-Covered Inscription on Church Wall Takes Place of Service Flag. The Figures Given Indicate the Number of Men in Uniform and are Painted on the Outside of the Glass So That They can be Changed Easily if Need Be**

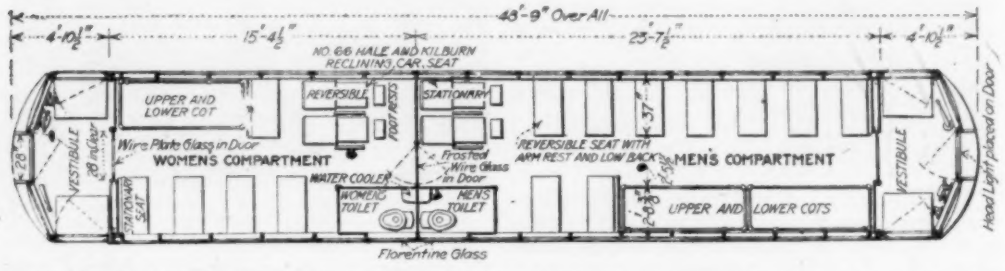
A large Cincinnati congregation, instead of displaying the conventional service flag in honor of its members in the service, has placed a tablet on an outer wall of the church. It consists of a prayer surmounted by crossed flags painted on canvas and inclosed in a frame. One of the flags is a national ensign and the other is covered with stars. The whole is protected by heavy plate glass. Instead of adding more painted stars as occasion required, the total number of men in the service is painted on the outside of the glass and can be easily kept up to date. Space was left either side of the number for gold stars.

¶ While at an altitude of 4,800 ft. an aeroplane passenger at one of the southern aviation camps recently made a successful parachute jump. Just as the leap was about to be made, the pilot stalled the engine slightly and banked sharply to the right so as to throw the tail of the plane out of the way of the parachute. The success of the experiment may lead to a general equipment of military airplanes with parachutes.

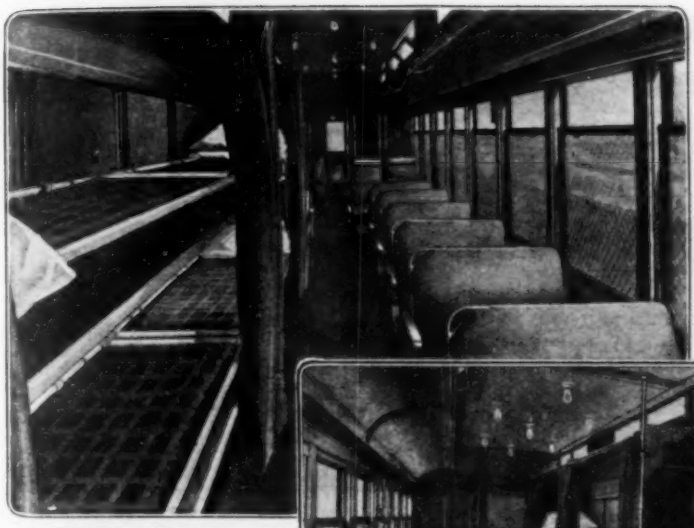
## INTERURBAN CAR EQUIPPED TO CARRY INSANE

For the purpose of transferring insane patients from Cook County's psychopathic hospital, in Chicago, to various state institutions with the least inconvenience and publicity, the county authorities have had built an interurban car of special design which travels from the hospital yard direct to the asylums. Outwardly the car resembles those in service on Chicago's surface lines except that the windows are of wire-reinforced glass and are protected on the inside by heavy screens.

The interior is divided into two compartments, one for men and the other for women. Each is furnished with several ordinary reversible seats and upper and lower berths, of a folding type, for invalid patients. Cloth curtains can be drawn in front of the berths to give the occupants privacy. Toilet facilities are provided for each compartment. In the women's section two of the seats are of the reclining-chair type. The marker lights and an emergency light in each section automatically connect with storage batteries in case the trolley pole leaves the wire, so that the car is not plunged into darkness when connections are broken at night.

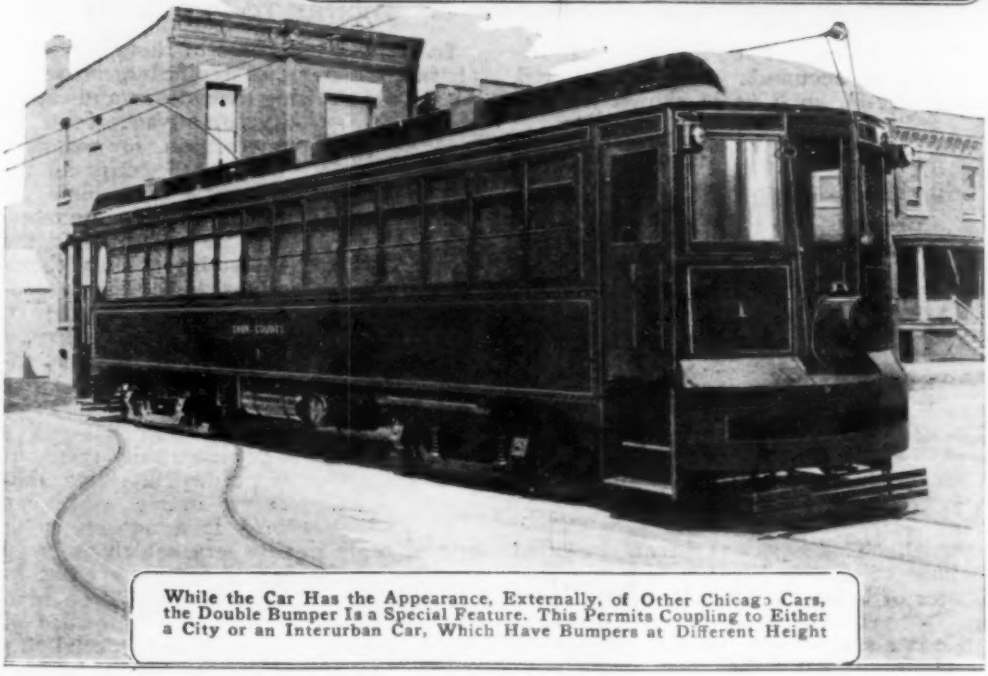



**Floor Plan of Hospital Car for Use on Chicago Surface Lines and Connecting Interurban Lines, Showing the Relative Size of the Two Compartments and the Number and Arrangement of Seats and Berths**



At the Left Is an Interior View of a Special Car Designed to Carry Patients from Chicago's Psychopathic Hospital Direct to Various State Institutions. In This Compartment, Which Is for Men, Are Leather-Covered Seats of the Reversible Type, on One Side, and on the Other Side are Two Lower and Two Upper Berths, Which can be Shut Off by Curtains

The View at the Right, as Well as Those Above and Below, Shows the Windows Protected on the Inside by Heavy Wire Guards to Prevent Violently Insane Patients from Breaking the Glass. In Addition to the Regular Electric Lights There Are Emergency Lights Which are Automatically Switched on to Batteries if the Regular Current Supply should Fail



While the Car Has the Appearance, Externally, of Other Chicago Cars, the Double Bumper Is a Special Feature. This Permits Coupling to Either a City or an Interurban Car, Which Have Bumpers at Different Height

Patriotic Window Display in Jewelry Store, Depicting Nation's Spirit and Resources: In the Foreground Is a Map of the United States Made of Red, White, and Blue Velvet. The Statue of Liberty and the Cornucopia Overflowing with Grain Each Tells Its Own Story

## STORE WINDOW SHOWS SPIRIT AND RESOURCES OF NATION

A window display in a large Chicago jewelry store recently expressed with exceptional artistic skill the spirit of America and its readiness to draw on its abundant resources in meeting the demands of war and the reconstruction period. The central feature was a large map of the United States, tufted red, white, and blue velvet being used to represent the various states. At the upper edge of the map, which was tilted toward the window, lay a large cornucopia overflowing with grains, while beside it rose a white miniature of the Statue of Liberty. On pedestals at either side were busts of famous presidents and military leaders of the present day. Silk flags were used as draperies.

## MANY TONS OF HAY PILED IN THE OPEN

In these times of food and feed shortage, a large accumulation of unsheltered, baled alfalfa, such as is shown here, is unusual. The hay was in an irrigated section of Colorado and was in little danger of being damaged by rain. There are 600 tons, or more, in this pile, accumulated in a single week pending the arrival of freight cars for shipment.

A Pile of 600 Tons of Alfalfa Worth Many Thousands of Dollars: This Big Pyramid of Bales Is the Result of a Week's Haymaking in a Fertile Irrigated District in Colorado

## NATIVE ALASKANS SHOW DESIRE TO PROGRESS

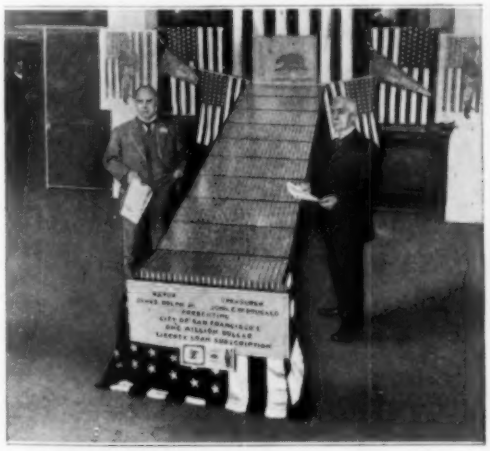
In many ways, some of them very simple in character but significant, natives of Alaska are showing their desire and capacity for advancement. In one region, for example, where practically all the traveling is done by water and an unnecessary number of dogs are kept, the natives themselves have been advocating the killing off of many of these animals because of the much-needed food that they consume. This indicates the development of a real community spirit. It is noteworthy, also, that every native who can read is a subscriber to one or more newspapers, which are read slowly and carefully. In many cases illiterate parents have their children read to them that they may keep informed of world events. They show special interest in items gathered from the school.

## MAY MAKE RHONE NAVIGABLE FOR BENEFIT OF SWISS

French engineers have evolved a plan for making the Rhône River navigable from the Swiss border to Marseille. When peace comes the question will be raised as to what water route to the sea, other than the Rhine, can be offered the Alpine republic. Though by international agreement the Rhine is a free river, it has been closed to Switzerland since the beginning of the war. The opening up of the Rhône to navigation is the proposed means of relieving the Swiss of their present dependency on Germany. It is said that it will only be necessary to make 20 additional miles of the Rhône navigable, and that this can be accomplished for the most part by building a lock at a point which has been selected. This lock would make available an immense amount of hydroelectric power which would largely pay for the investment.

## MILLION DOLLARS IN GOLD FOR LIBERTY BONDS

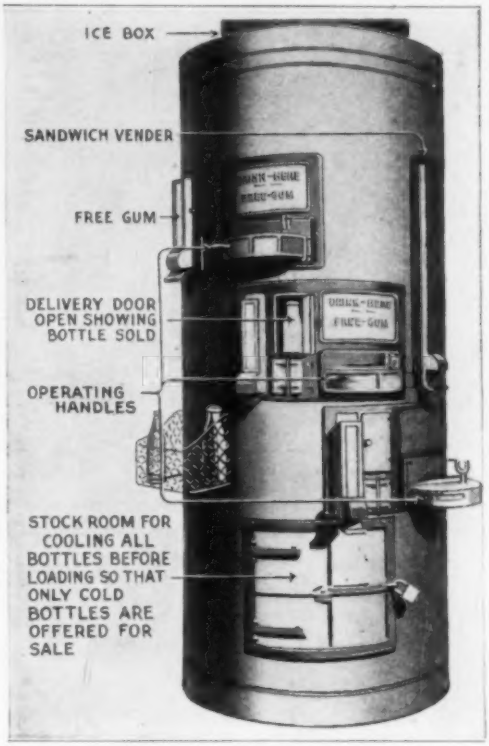
The popular phrase, "It looks like a million dollars," could be applied without exaggeration to a pile of gold coin which was recently exhibited in San Francisco. That municipality bought $1,000,000 worth of Liberty bonds and paid for them in gold specie. The exchange of the coin for the government certificates was made a formal affair and the money paid was arranged in neat piles on a long inclined table decorated with the Stars and Stripes, and with a number of pennants.



**One Million Dollars in Gold Coin Paid by the City of San Francisco for Liberty Bonds**

## SOFT DRINKS AND SANDWICHES ARE SOLD BY MACHINE

One of the interesting developments in the vending-machine field is a large apparatus that dispenses bottled beverages,


ICE BOX
SANDWICH VENDER
FREE GUM
DELIVERY DOOR OPEN SHOWING BOTTLE SOLD
OPERATING HANDLES
STOCK ROOM FOR COOLING ALL BOTTLES BEFORE LOADING SO THAT ONLY COLD BOTTLES ARE OFFERED FOR SALE

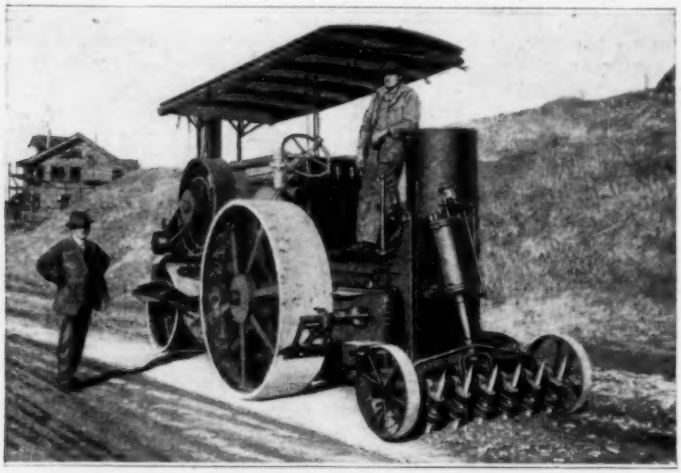
**The Big Vending Machine Dispenses Cold Bottled Beverages, Sandwiches, and Chewing Gum, Rejects Counterfeit Coins, and Keeps a Complete Record of All Transactions**

sandwiches, and chewing gum. The device operates much the same as smaller machines of similar purpose with which the public is familiar. Its cooling chamber has space for the accommodation of 96 bottles, while a precooling compartment, in which bottles are chilled by immersion in the water that drains from the ice, has an equal capacity. In order to encourage patrons to return empty bottles to the machine, a stick of gum is discharged when a bottle is placed in the receiver provided for it. A counterfeit detector rejects spurious coins. A complete record of all transactions is kept by a sales-registering mechanism. The only attention the machine requires is that involved in stocking and icing it daily.

¶In Norway whales' intestines are being prepared for use in making gloves.

## USE STEAM-ROLLER SCARIFIER ON CALIFORNIA ROADS

For road-repair work the street department of San Francisco makes use of a steam-operated scarifier that is attached at the rear of a steam roller. It breaks up the hard surface dirt so that a grader, that follows behind, can perform its function effectively.



The Road Scarifier at Work, Preparing the Way for the Grader: It is Operated by the Cylinder Visible at the Rear, Which is Supplied with Steam from the Boiler

## "AMERICA'S ANSWER," A WONDERFUL MOVING PICTURE

What would we all not give to be set down for a couple of hours in that new vast seaport of France which the United States created in a few short months? To see the convoys arrive and dock, with thousands of our boys disembarking, along the miles of wharves, and transfer to American cars drawn by huge American locomotives on the hundreds of miles of American-built railroads? Would you not enjoy a sight of how all manner of war machinery and supplies are transferred from ship to train, and watch the magic assembling of locomotives from parts made here; and the great machine shops, cold-storage and ice plants, and a city of warehouses filled with all kinds of supplies? All these things and hundreds more of the constructive achievements of our government, are to be seen in that remarkable U. S. official war picture, "America's Answer," issued by the Division of Films, Committee on Public Information. This is not a battle movie, though it shows how the boys live, and scores of interesting things connected with army life. Every person in this country should see "America's Answer." If your favorite movie theater has not yet had this film, ask the manager to secure it, and witness one of the biggest surprises you ever had.

## SCHOOL IN DEATH VALLEY HOUSED IN BOX CAR

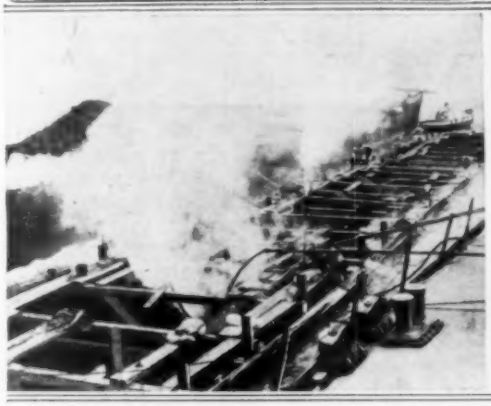
At Tecopa, Calif., in the heart of Death Valley, the schoolhouse where 16 children of the mining camp assemble daily is a box car. The housing facilities in this desert spot are so limited that there seems to be no other place where the children can gather. The woman teacher for these little folks, three of whom are Piute Indians, has divided the car into two rooms; one for her living quarters, and the other for the schoolroom. The car has a door at one end and small windows as well as a door in each side, all of which fit tightly to keep out the driving sand during the sandstorms.

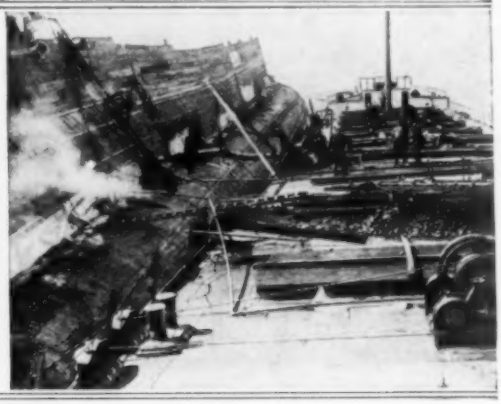
Sixteen Pupils and Their Teacher, at the Left, Standing in Front of the Box Car at Tecopa, California, Which Serves as Their Schoolhouse, Protecting Them from the Hot Sun and Sand of the Desert

# USE BIG COFFERDAM TO RAISE FOUNDERED STEAMER

The Long Cofferdam in Position over the Sunken Hull of the "Henry Cort," Ready to be Submerged and Screwed in Place by Divers

Showing the Cofferdam Fast to the Foundered Whaleback and Protected against the Waves by Vessels Stationed at the Sides and Ends





The Picture Above, at the Left, was Taken When the Final Pumping Operations were Begun. The Other Photograph Shows the Whaleback Freighter at the Surface, the Cofferdam Still in Place

Several weeks ago, before the close of navigation, salvagers succeeded in raising the sunken whaleback freighter, "Henry Cort," from the bottom of Lake Erie, where it had spent nearly a year. Late in the season of 1917, while battling in the ice floes, the ship collided with another steamer and sank near the west shore of the lake. In the spring, after some difficulty, it was sighted in 30 ft. of water about six miles from its original location, whence it had been carried by the ice during the winter months. The hull was imbedded in the mud so that the deck was from 12 to 16 ft. beneath the lake's surface. Because the ship was well out in the open lake, the difficulties of raising it were multiplied. The first attempt was a complete failure, for the deck collapsed under the strain of pumping. A cofferdam, 240 ft. long, was then made fast to the hull by divers, but was almost immediately wrecked during a storm. A similar accident occurred subsequently. Late last September, however, a final and successful effort was made. The cofferdam was reinforced and protected from the sea by barges placed alongside, and a steamer was anchored across the end exposed to the weather. By pumping rapidly the hull was raised to the surface and, upon inspection, was found to be in need of only a reasonable amount of overhauling. The vessel has a cargo capacity of 3,600 tons.

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¶A chemical concern has prepared a traveling exhibit giving a comparison between American and German dyestuffs, which has aroused much interest because of the manifest excellence of the American products shown.

# THE CAMPAIGN OF THE CAVES

By BRANDON TRACY

The text of this article has been passed by the Chief Military Censor.

"CITIES on fire! Germans evacuating!" cry the newspaper headlines. "We'll be in Brussels next week sure!" comments my neighbor. "Why not, if they're getting out?"

Next week's papers do record a considerable advance. The allies occupy nearly five miles of territory that has been contested stubbornly on a twenty-mile front. But Brussels? Probably the Hun tenants are just contemplating signing up another year's cutthroat lease. They know the allied ranks, although advancing rapidly, will not be able to oust them for a long time—and they know why. With the cunning of scientists, driven insane by the maniacal demands of German warfare, they have prepared every foot of evacuated territory so that the victorious allies and the returning peasantry will find it a constant nuisance, threat, and menace. Each spring has been doctored so that the clear water, bubbling up, passes through a one-foot layer of sand intermingled with crystals of poisonous substances. For weeks it offers satiation of thirst—and death. The wells are fixed in like manner, or are crammed with the putrefying bodies of horses. Each knoll, each probable site for a hospital, ammunition dump, battery emplacement, or battalion headquarters has been mined. Deep in the ground somewhere a terrific charge is waiting, finally to be detonated by a time fuse that may take ten days to reach the high explosive. The trenches and dugouts abandoned often are mined in such fashion that the entry of hostile troops will cause an explosion that caves in the walls. There is a quality about such a catastrophe which tickles Fritz's instinct for *schrecklichkeit*. It is the same instinct, perhaps, which prompts lawless urchins of ten or twelve to place a bucket of water at the top of a half-opened door, so that anyone entering will be drenched. The urchins get this whipped out of them —and so will Germany.

Before the infantry and artillery can take possession of the regained territory, or the happy French or Belgian peasant start tilling the war-corroded soil, the allied engineers must examine it painstakingly. All the swampy regions from which poison gases are emanating must be neutralized, all wells and springs must be cleansed, and all mines either exploded or rendered impotent. This is the ideal; in actual practice often it is advisable for troops to pursue a fleeing enemy even at the risk of many casualties from his devilish devices, but wherever ordinary conditions prevail the advance awaits the O. K. of the engineering sections.

The mechanical and scientific death traps are not always all that Fritz leaves behind when planning the victorious enemy's destruction. Sometimes the retreat is not sincere; it merely masks a terrible ambush, calculated to cut off and wipe out a battalion or more of allied troops. What was perhaps the greatest large-scale example of this sinister strategy occurred during the allied advance in the Mount St. Eloi sector during which the great caves of Zivy were captured.

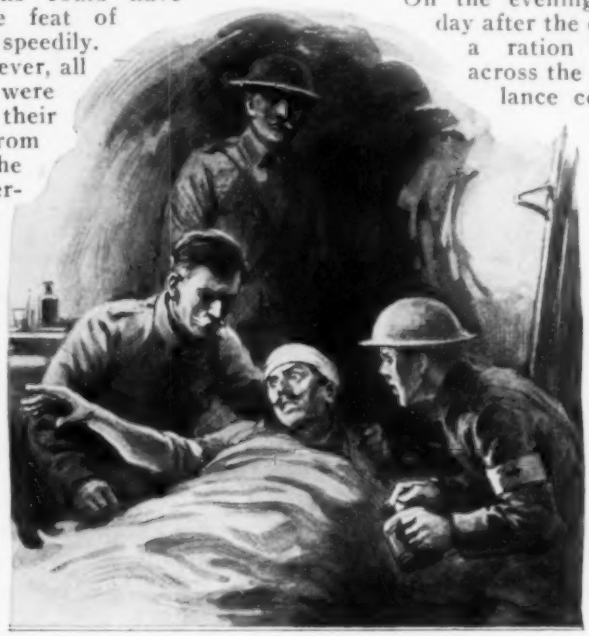
Canadians and French had been cooperating on this front, which in peace times had been the limestone quarry of western Europe. Great holes lay everywhere, some one thousand feet in width and a hundred feet deep. At the bottoms of many, passages led to underground chambers, and out to other excavations. Here and there, in the uncut brush on the surface, unsuspected air holes waited the feet of the incautious explorer.

Because of the rock hoists and the narrow-gauge tracks the Germans found in these caves and excavations, they had been able to set up quarters of comparative luxury. The dugouts were carved holes reaching into the solid rock, shellproof and easily warmed in winter. The officers all had subterranean chambers, and in many of these were complete wine cellars and stocks of provisions taken from the civilian homes in the towns they had pillaged. Naturally the Germans hated to give up this position for the open trenches in the plain to the east.

A concerted attack by the French and Canadians, however, drove them from a ridge which commanded many of the excavations. From the top the allied guns poured projectiles of all kinds to the depths of the open quarries. In spite of frantic counterattacks the Huns found themselves compelled to give way. It even looked as though, because of the difficulties of transporting their matériel, some prisoners and a great deal of booty would have to fall into allied hands. The appetites of the Canadians, in particular, had been whetted by tales recited by German prisoners. These men had described some of the luxurious caves occupied by the officers, and as a result every Cana-

dian promised himself a treat when the enemy was driven out and the process of consolidating the new position began. Everyone looked for a stubborn fight, however.

Then one morning the Germans had departed. Their new line was in rapid process of construction nearly two miles to the east. Not a German remained visible in the region of Zivy Caves! The allied officers rubbed their eyes. This was almost too good to be true! Without even a bayonet charge they had won this coveted position! As they advanced slowly and cautiously, all speculated on how the Germans could have accomplished the feat of withdrawing so speedily. At this time, however, all the allies still were learning much of their military science from the enemy, and the perfection of German methods still was undisputed. One rather expected the Huns to accomplish near-miracles in making war; hadn't they been studying it all out for half a century? It would have taken little argument then to convince all of the men and most of the officers that this very move had been planned years before in Potsdam—as perhaps it had. The men, at least, were willing to let the Huns accomplish all the retreating miracles they wished, so long as each time they left their champagne cellars and kilometers of fresh sausage behind.



*"On reaching the dressing station, the poilu regained his senses for a time, and told a startling story. . . . .As they were crossing a space of heavy grass and weeds on apparently solid ground back of the lines, the earth had given way beneath them. They fell many feet and landed in the midst of a huge German encampment."*

They had left a great deal of this behind on this occasion. Perhaps it was too much to ask that they save all of their war matériel and their sausage in one night, but knowing Fritz, one could scarcely imagine him leaving the sausage. The Canadians and a small body of French moved in and occupied the intricate system. The moment danger of immediate enemy attack seemed to have passed, and consolidation of the new positions was well under way, something like a barbecue started. The Canadians in particular, though "fed up" on bully beef and hardtack, still had appetite for all of Fritz's stolen comforts. Many lean men from the plains of Saskatchewan made a good start in two days toward corpulency.

In the light of after events, this must have been just about as the German command had figured. Had nothing occurred to prevent, the feasting men would have paid a high price for their two days in the German quarters.

On the evening of the second day after the capture, however, a ration party stumbled across the body of a French lance corporal who had been sent on patrol duty early in the day. The man was unconscious, with a badly smashed shoulder and arm, and a bayonet thrust in the abdomen. On reaching the dressing station, the poilu regained his senses for a time, and told a startling story. He and the private with him, it seems, had started to reconnoiter just before dawn. As they were crossing a space of heavy grass and weeds on apparently solid ground, the earth gave way and they fell many feet. The private was killed, but the lance corporal, though badly injured, was still conscious. He had fallen in the midst of a huge German encampment!

While he was lying there he attempted to lift himself, and a German had run him through with a bayonet. Then he had been thrown into a corner for dead. During flitting periods of consciousness he managed to make out that the force was stationed in one of the largest of the caves. Without mistake it was waiting for some-

thing. A few of the phrases he caught led him to believe that it was an attack upon the Canadians. That evening he had managed to crawl away without being observed, and had mounted one of the rude ladders painfully, step by step, until he fell in the grass outside on the surface.

The astonishing story was taken seriously enough by the commander of the French forces, though the Canadians were a little inclined to scoff. Several patrol parties were sent out, and came back with the tremendous news that fully half a German division was hidden down in a series of adjoining caves, evidently preparing for an attack in force upon the rear of their old positions. They had cut off the caves they occupied by blocking up the old entrance with stones and camouflaging it well with branches and dirt. The allied soldiers had not suspected that any more of the caves existed. That night a force of Canadians and French surrounded the air holes and the old entrance. A message was dropped down, demanding instant surrender on the part of the forces in the caves. No reply of any kind was made to this, but suddenly the old entrance was blown out, and the German picked troops attempted a sortie. Hundreds were slaughtered as machine guns played across the entrance.

Then the defenders drew back, evidently to try new ways of egress. The few that came up the ladders to the air

holes were knocked back or shot, and then the gas tanks were brought up. For two hours a steady stream of the poison gas the Germans themselves had brought into "civilized" warfare, streamed down into the caves. Then a white flag was sent up, and

*"That night a large force of Canadians and French surrounded the air holes and the old entrance. . . . Suddenly the old entrance was blown out and the Germans attempted a sortie. Hundreds were slaughtered as machine guns played across the entrance."*

the remnants of the Germans, choking and black in the face, came up and surrendered.

Over eight hundred of them were dead in the caves, either from the concentration of gas or from the attempts at sortie. Nearly four hundred prisoners gave themselves up at the air holes, while over three thousand stumbled blindly out of the old entrance, crying *"Kamerad!"* Every particle of the war matériel taken with them into the caves for the destruction of the Canadians fell into the hands of the allies.

From cross-questioning of prisoners it was found out that at 4 a. m. a concerted attack was to have been made by this force and by the German troops in the new positions, the object being to wipe out the hated Canadians, regain the old position, and perhaps create a dangerous break in the allied lines before reserves could be brought up.

Promptly at four a tremendous explosion took place near the new German lines, and their ranks came over in the expected attack. They had learned nothing of the disaster which had befallen their comrades. They met a solid wall of resistance, and in twenty minutes had piled their dead as high as a breastwork on the strip of ground above the caves. The attack was shattered completely, and some of the remnants of the storming troops were taken prisoners.

King George of England bestowed the Victoria Cross on the dead lance corporal, while the government of France also gave him the highest military honors. While in mortal pain, he had thought of his country and of the forces from overseas who were fighting for his country, and had saved them from probable annihilation at a dreadful cost to himself. His name, Hémin Gouraud, will go down in the annals of two great nations as one of the greatest of military heroes.

## PLANS OF LARGEST DRY DOCK FOR NAPLES APPROVED

Evidence of the great industrial awakening which is taking place in Italy is to be found in the proposed great dry dock for Naples, plans for which have been approved by the government. It is said that this will be the greatest dry dock on the Mediterranean. The projected improvements also include the construction of an industrial port.

¶Among the high rates recently paid for freight shipments from Buenos Aires to New York and Boston are $90 per 40 cu. ft. of space for wool, $120 per ton for tallow, and $80 per 50 cu. ft. for cheese.

## FINGER-PRINT PHOTOGRAPHY AIDED BY SPECIAL CAMERA

Of considerable importance in criminal detection is a new finger-print camera that is coming into use. The instrument is of compact size and of such simple operation that its successful use does not depend upon expert knowledge of photography. It accommodates either plates or films, and makes full-sized reproductions of details included in an area 2⅛ by 3⅛ in. The instrument is equipped with four small incandescent lamps operated by batteries contained in the camera housing. They are mounted in an accessible position back of the front aperture and are automatically switched on, supplying brilliant illumination, as the shutter is actuated. No thought has to be given to focusing, for all pictures are taken with the front opening of the camera pressed firmly against the surface on which the finger print, or other subject, is located. Incidentally the instrument is also adapted for making photographic reproductions of signatures and certain other things.

## PICTURES BRING WAR HOME TO THE PEOPLE

That photography has played a larger part in the great war than in any previous conflict is strikingly illustrated by the extensive work of our government in procuring and exhibiting official photographs. Still and motion pictures have been taken in great numbers, chiefly by Signal Corps units, to be used as historical records and as propaganda. All negatives and prints received from overseas have been delivered to the general staff at Washington, and duplicate negatives, of no value to the enemy, have been released for various forms of publicity. Official war films, such as private concerns would have had much difficulty in procuring, have been exhibited in thousands of motion-picture houses and all rental fees paid therefor have been used to exhibit pictures gratis in cantonments and at the front. They have also been shown with good effect in foreign lands where American and allied propaganda was needed. In many respects the pictures have had greater force than printed matter in keeping up the morale of the people "back home," and in counteracting the German lies which were spread with such pernicious vigor before the Teutonic decline set in.

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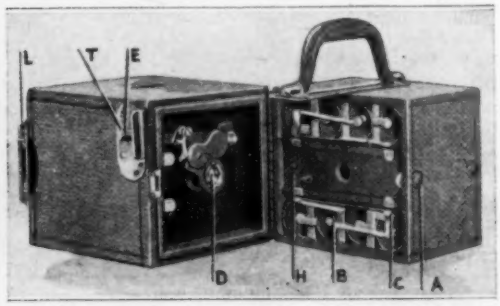
¶ In one year $35,000,000,000 of war-risk insurance has been written by the government for its fighting men. This is practically equal to the amount of ordinary life insurance outstanding with all the life-insurance companies in the world at the beginning of the war. Furthermore the sum represents policy holders embracing more than 90 per cent of the personnel of the army and navy.



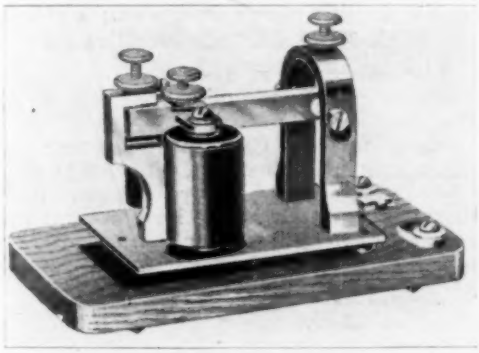

**Left: Finger Prints Left by Yeggmen on Top of Looted Safe are being Photographed. In the Lower Left-Hand Corner Is a Reproduction of a Finger Print. At the Right is Shown the Interior Arrangement of the Camera: L, Plate Holder; T, Registering Line; E, Exposure Lever; D, Anastigmat Lens; H, Independent Light Switch; B, Batteries; C, Contact Points, and A, Locking Button**

## ARMY AIRMAN MAKES NONSTOP OCEAN-TO-OCEAN FLIGHT

Major W. W. Wynne, of the 79th Aero Squadron, holds the distinction of having made a nonstop transcontinental flight in 34 minutes. Carrying U. S. mail and Liberty-bond applications, he left the Atlantic seaboard at 9:31 a. m. and reached the Pacific side at 10:05 a. m. The ocean-to-ocean flight, the first that has been accomplished by an aeroplane carrying mail, was made October 19 at the Canal Zone. The distance traversed is approximately 38 miles.

## TELEGRAPH SOUNDER USES ALTERNATING CURRENT

A sounder now being introduced in telegraph stations, particularly in towns and villages where direct current is not available, can be used on any 110-volt, 60-cycle, alternating-current circuit, thereby eliminating the trouble and expense occasioned by the use of batteries. The amount of current required is so small that the cost of maintenance is very low. While in general design the instrument

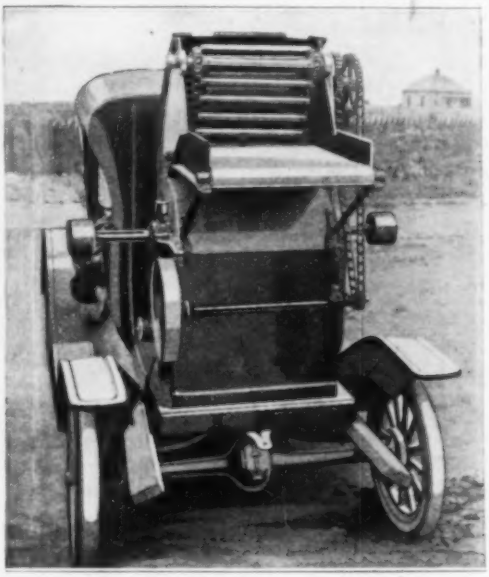


**Sounder for Telegraph Office, Which can be Used on 110-Volt Alternating-Current Circuits, Thereby Eliminating the Trouble and Expense Due to Batteries**

resembles standard sounders now in use, a special feature of this instrument is the abbreviated armature which moves between extensions of the magnetic-spool cores which point toward one another.

## AUTO CARRIES AND DRIVES SALESMAN'S SAMPLE

An interesting example of the manifold serviceability of an inexpensive runabout is furnished by a salesman who sells grinding machines to farmers. He carries one of his machines on a platform at the rear of his car and, by means of skids which he takes with him, quickly lowers the grinder to the ground when there is



**Rear View of Salesman's Automobile Carrying Sample Grinding Machine, Which is Placed on the Ground for Demonstration Purposes and Driven by the Car Engine**

prospect of a sale. The rear of the car is then jacked up, and a belt, running over a special pulley on the rear axle, transmits power from the car to the grinder.

## MINIATURE METAL AEROPLANE RELIC FROM FLANDERS

Among the mementos of the war that are constantly finding their way to America is one from "Flanders' fields" that is oddly representative of three arms of the military service. It is a model aeroplane constructed of trench souvenirs by a British Tommy. A shrapnel head surmounted by a Mauser rifle cartridge forms the base and support for the tiny craft,

the body of which consists of a second cartridge fitted with wings made of brass, probably taken from a shell casing. The propeller and running gear are made of aluminum.

## OFFICE MOVED INTO STREET TO ESCAPE INFLUENZA

When the Spanish influenza epidemic broke out in Seattle the officials conducting the government's employment office for shipbuilders decided, as precaution against contagion, to move their desks into the street. Booths consisting of wooden frames covered with canvas were used to shelter the employes and the office furniture necessary for carrying on work with the men who gathered on the pavement seeking jobs.

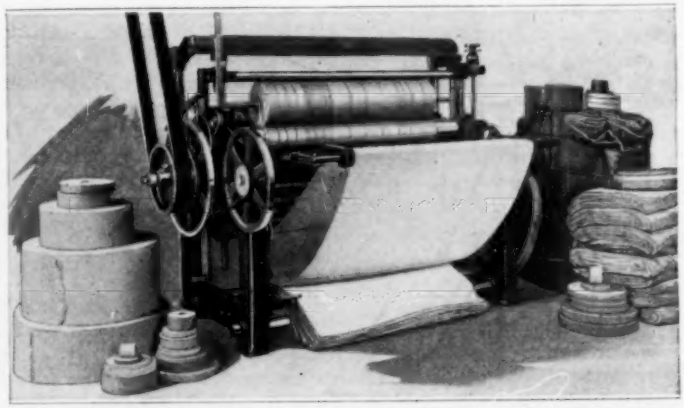
**Booths Sheltering Employment-Office Clerks in Seattle, Washington, Who, during the Influenza Epidemic, Moved Their Desks into the Street and Transacted Business in the Open Air**

## AERIAL WAR ENTERS NEW PHASE AS HUN BEGINS TO WEAKEN

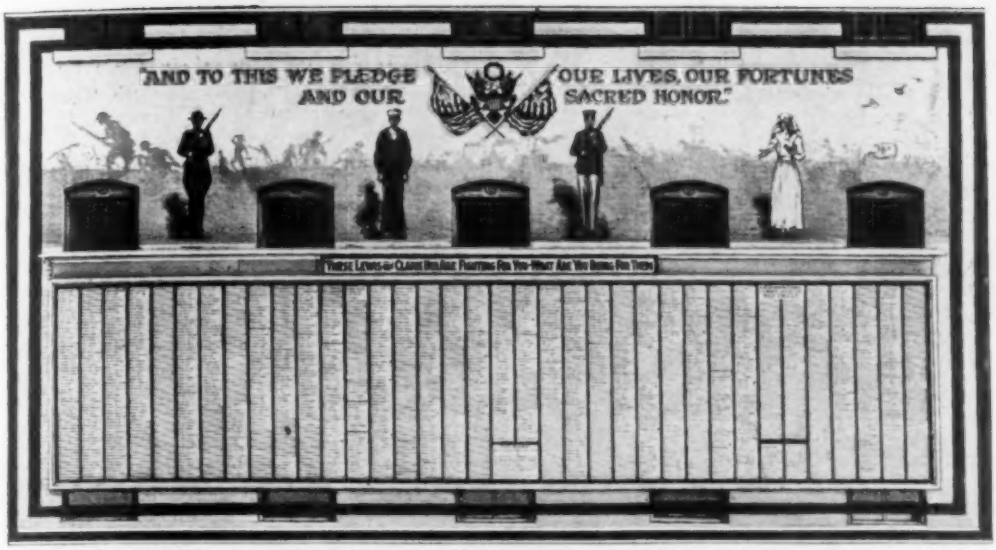
Since that eventful night in 1914 when a German Zeppelin, shrouded in darkness, slipped above the fortifications at Antwerp and began the first aerial bombardment of a sleeping city, Tennyson's prophetic lines, "Heard the heavens filled with shouting, and there rained a ghastly dew from the nations' airy navies, grappling in the central blue," have been quoted and requoted. No single incident, however, has served so fittingly to recall their significance as that of a few weeks ago when an American bombing program was executed with amazing dash by a fleet of 350 machines. It is doubtful if on any previous occasion during the four years of aerial warfare so large and impressive a group of aeroplanes has flown in formation. Two hundred and fifty bombing planes protected by 100 pursuit machines dropped 32 tons of bombs on German cantonments between Wavrille and Damvillers, a few miles north of Verdun. Only one of the vessels failed to return to its base. The cheering news of this great feat, which it is safe to say might at any time have been surpassed, had not Germany begged for an armistice, was followed by the announcement at Washington of an agreement to group the aerial navies of the allies so as to effect unified command as well as cooperative production of all the various kinds of air craft.

## NEW TIMESAVING MACHINE FOR RED CROSS WORKERS

The effectiveness of Red Cross workers' services is multiplied many times by the use of a machine, designed particularly for Red Cross headquarters and other of its large centers, which slits full-width goods suitable for surgeons' bandages and rewinds it into large rolls at the rate of 50 to 100 yd. per minute. These rolls are intended for distribution among



**A Machine That Saves Time and Labor for Red Cross Volunteers: With It a Bolt of Cloth can be Cut into Bandage Widths and Rewound at the Rate of 50 to 100 Yards per Minute**




This Honor Roll, Listing the Men and Women from Lewis and Clark County, Montana, Who Are in Their Country's Service, can be Expanded as Required and the Names Kept in Alphabetical Order. The Names are Printed on Pieces of Cardboard and Held in Place by Vertical Wooden Strips with Grooved Edges

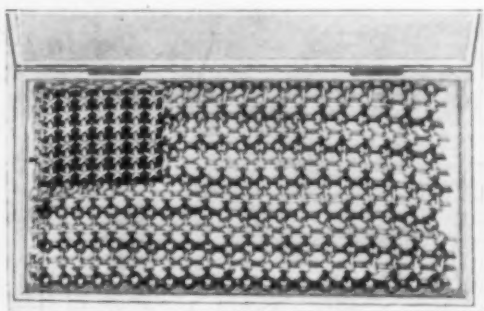
volunteer workers, who make them into smaller rolls of regulation size. The machine is belt-driven, and the bolt goods is fed through a set of small rollers, cut into strips of desired width, and wound onto a rod without any waste of material. No special skill is required to operate the machine. A measuring attachment records the number of yards passing through the cutter.

## DISTINCTIVE HONOR ROLL IN HELENA, MONTANA

The problem of providing an attractive honor roll at not too great cost, on which names can be listed alphabetically regardless of additions made from time to time, has been solved by Helena, Mont. The roll occupies part of a wall of a brick building and measures 20 by 36 ft. The lower half of the space is devoted to the names which are arranged in columns against composition board backed with horizontal strips. The names are printed on weatherproof pieces of cardboard and are held in place by vertical wooden strips having grooved edges. On the upper half of the wall space are painted four uniformed figures, one of which is a Red Cross nurse, standing against a background representing troops going into action. A red, white, and blue border incloses the whole board. The cost was $500, approximately. The adding of new names to this big roll is made a formal occasion at which relatives of the departing soldiers place the names in their proper places in the presence of a large audience.

## HAND-CARVED FLAG A MESH OF WOODEN LINKS

One of the most curious American flags in existence has been carved from a ¼-in. board by a cabinetmaker in Alaska. This single piece of wood was fashioned into a mesh consisting of 1½-in. links and stars—771 parts in all—which have never been apart. More than 1,500 hours were spent on the task. The flag measures 10¾ by 22¾ in. and is kept in a suitable wooden case. The red and white stripes are painted on alternate rows of links and a blue background is provided for the stars, which are white.



American Flag Consisting of 771 Interlocking Pieces Carved from a Single Board One-Fourth Inch Thick: Over 1,500 Hours were Spent on This Task

# TRAINING REPAIR MEN FOR THE ARMY

By GRANT M. HYDE

"WHO fixed your car?"

"The soldiers."

"The soldiers?"

"Sure—student soldiers at the university. Never cost me a cent. Overhauled it completely—for practice. And the boy who did the job should be marked 100—she runs like new."

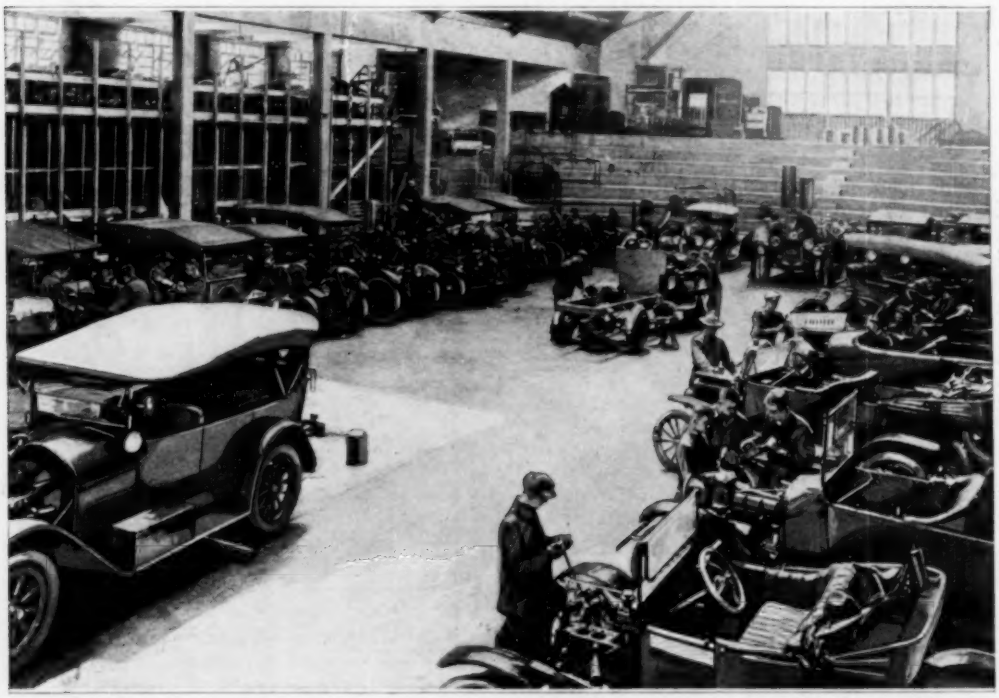
Common enough auto talk in Madison, Wis., the home of the University of Wisconsin, in whose shops 380 skilled gas-engine repairmen have been trained for the army in the past six months, and about 280 more are now acquiring skill as army-truck specialists, auto mechanics, tractor operators, and motorcycle repairmen. All are members of the army vocational detachment which the War Department established at the university last spring.

Many cars are needed for the men to work on, and citizens were invited to bring in their autos for overhauling. The first to respond did so hesitatingly and only in a patriotic spirit. When they drove out their cars, after the practice overhauling, they thought they had new ones. Each had been taken to pieces from radiator to tail light and carefully rebuilt.

Auto repairing is only one of a dozen, or so, army trades that soldiers learn in an eight weeks' course at the university. At present those in training include 150 radio operators, 70 truck specialists, 10 concrete foremen, 130 auto mechanics, 30 tractor operators, 50 motorcycle-repair men, 20 blacksmiths, 70 carpenters, 30 surveyors, 60 topographical draftsmen, 40 gunsmiths, and 40 general machinists.

In the past six months, besides the 380 gas-engine specialists, the university's vocational unit has trained 292 electricians, 60 sheet-metal workers, 226 woodworkers, 112 carpenters, 160 gunsmiths, 160 machinists, 40 radio operators, 40 radio constructors, 50 cement foremen, and 80 blacksmiths, prior to the present detachment.

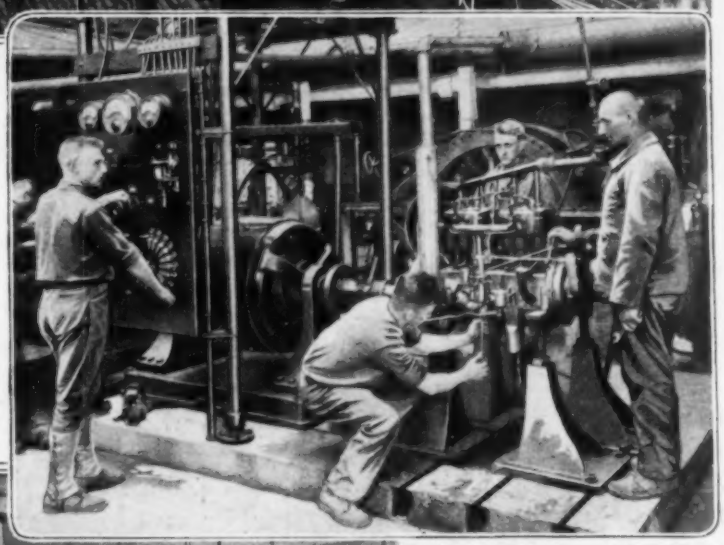
Practical problems are a feature of the work. The carpenters of the third detachment, for example, did practically all the work of erecting seven barracks in which the fourth detachment is quartered. Mechanics in other lines did other work on the buildings, including practically everything except plumbing, making them ready for the uses to which they have since been put.



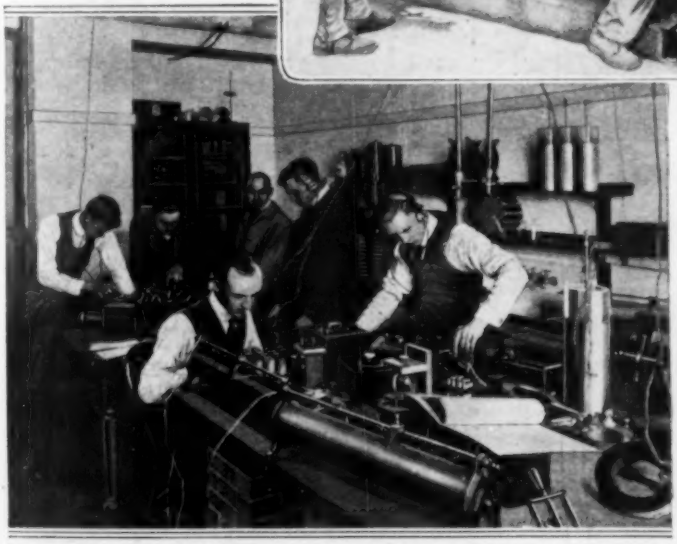
**The Stock Exposition Pavilion of the College of Agriculture, Where as Many as 280 Student Soldiers at the University of Wisconsin have Taken the Course in Motor-Car Repair at One Time**

Teaching Army Blacksmithing in the Shops of the College of Engineering

Cement students helped lay roads in and near the city and did the concrete work for a large ornamental terrace on the campus. Broken guns and broken airplane parts are used in other classes. Every man prepares to do a particular kind of mechanical work which the army needs to have done.



Prospective Army Electricians Receiving Training: Nearly 300 Young Men have been Graduated from This School



One of the Radio Laboratories in the Physics Building at the University of Wisconsin, Where Men are Trained for the Signal Corps: There Are Two Long-Range Receiving Stations for Practice Work

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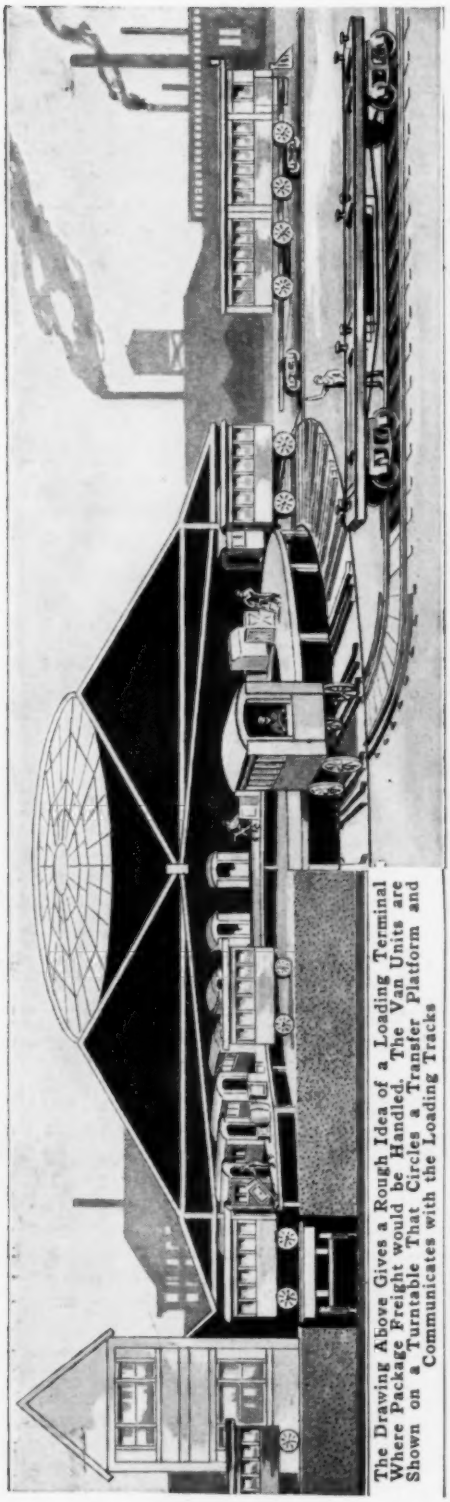
¶ For the convenience of its many women employes, the management of a large munitions factory has induced a department store in a neighboring city to establish a branch store at the plant, so that now shopping privileges and pleasures are brought within easy reach of all the workers.



The Drawing Above Gives a Rough Idea of a Loading Terminal Where Package Freight would be Handled. The Van Units are Shown on a Turntable That Circles a Transfer Platform and Communicates with the Loading Tracks

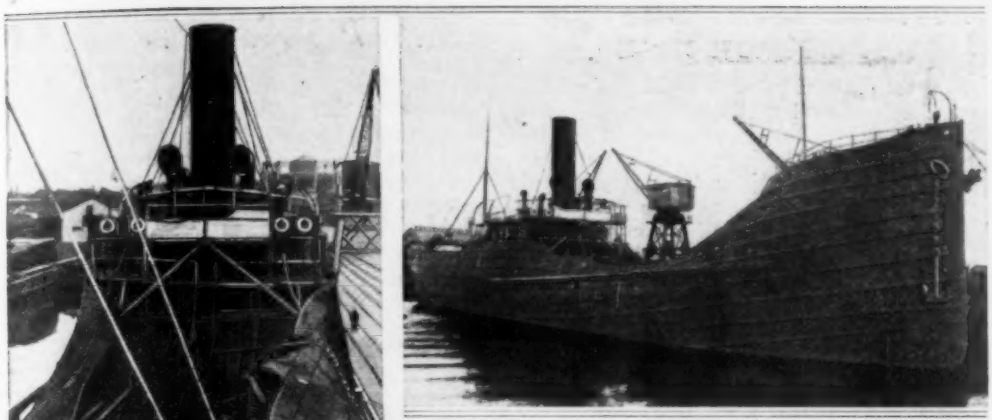
One of the Particularly Interesting Features of the Plan Is That the Loading and Unloading of the Major Number of the Van Units would be Accomplished at the Warehouses of the Shipper and Consignee, Eliminating All Rehandling at Terminals and Thereby Facilitating the Rapid Movement of Freight

## VAN-CARRYING CARS PLANNED, FOR SMALL LOTS OF FREIGHT

Quite an interesting method, the practicability of which yet remains to be demonstrated, has been suggested for facilitating the handling of less-than-carload freight. Despite the fact that the system depends upon the adoption of a radically new type of rolling stock, the plan is credited with having attracted the serious consideration of engineers representing certain transportation and car-building companies. The purpose of the scheme is to eliminate the rehandling of small shipments of freight, by providing means for their dispatch direct from consignor to consignee. It is proposed that this be accomplished by constructing and operating what might be termed segmented cars. One of these would consist of a specially designed chassis adapted to carry several horse-drawn or motor-trailer van units of approximately five-ton capacity. These members would be substantially built of steel and so arranged and vestibuled that, when loaded astride the chassis and locked end to end, they would present an unbroken car-body alinement. Obviously any of several methods might readily be employed for loading the vans on a carrier car and subsequently removing them upon arrival at their destinations. It is considered that it would be possible, for instance, to line a number of the units astride a railway track, move carrier cars beneath them, and accomplish the loading and centering with pneumatic aid. Unloading might be accomplished by reversal of the procedure. When placed on the ground in a terminal yard, a van unit would be drawn by horses or trailed by a motor truck to its final destination and there unloaded. The plan contemplates the construction of carrier cars of types adapted for various conditions. For interurban use some would be self-propelling.

## BUCKLED STEAMSHIP IS BRACED FOR VOYAGE TO HOME PORT

Unusual measures were taken to enable the British steamship "Netherton" to put to sea from Singapore for a home port where repairs could be made, after it had been seriously damaged by a benzine explosion and fire in its hold. The upper part of the steel hull on both sides of the ship collapsed forward of amidships. To prevent further buckling, a long steel beam was placed along the



The Photograph at the Left Gives a Deck View of the Buckled Ship and Also Shows How the Reinforcing Beams were Fixed in Place along the Sides of the Hull. Another View is Presented Above, Which Clearly Indicates the Length of the Beams That were Used, One on Each Side

exterior of both sides. They spanned the sunken portions and were held firmly by right-angle brackets that were riveted to the hull. Reinforced in this manner, the freighter was able to limp home without being battered to pieces at sea.

## YANKEE AIRMEN ARE EQUIPPED WITH NEW OXYGEN OUTFITS

Prior to the signing of the armistice the War Department had announced that all American airmen using combat, reconnaissance, and bombing planes would be supplied immediately with oxygen-breathing apparatus for use at high elevations in the war zone. The devices, recently adopted as standard equipment, are being manufactured in sufficient quantity to meet all requirements. The tanks carry enough gas to last six or eight hours, and enable fliers to remain at great altitudes for long periods without suffering from the effects of the rarefied atmosphere.

## GIVERS PIN MONEY TO BAG HUNG IN PUBLIC SQUARE

When a resourceful member of the Red Cross at Anderson, S. C., suggested that a bag be hung in the public square to receive discarded samples of cotton from dealers and small gifts of the same product from farmers, the idea proved unexpectedly profitable. One day some one, in lieu of a cotton gift, pinned a $5 note to the bag. It was decided to allow the bill to remain as a suggestion to others. In less than 10 days $600 in cash, besides many pounds of cotton, had been

This Bag, Placed in the Public Square in Anderson, South Carolina, to Receive Gifts of Cotton, was Soon Covered with Bank Notes, as Well as Filled with Cotton—All for the Red Cross

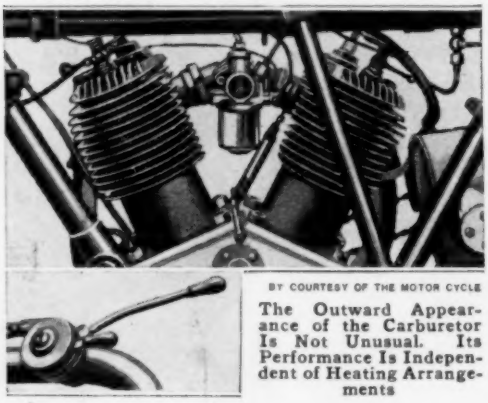
collected by the bag. The idea was soon copied in neighboring towns with good results accruing in each instance, according to information at hand.

## NOVEL PEDESTAL LAMP MADE FROM PROJECTILE

Several months were devoted to fashioning the unusual pedestal lamp shown herewith, the standard for which is made of a large projectile. The lamp stands 34 in. high and the lower portion of the upright is elaborately embossed with a twining vine and other figures. This work was done with a cold chisel, punch, and hammer. Three deer heads, of cast brass, are mounted on three sides of the projectile at the upper end, and from each hangs an ornamental lamp. At the top of the standard is a time fuse.

## BRITISH CARBURETOR PERMITS MOTOR TO BURN KEROSENE

Astonishing claims are made for an automatic carburetor that has been developed of late in England. The details of its construction are withheld, but its performance is said on good authority to be remarkable. During a demonstration test it was used on a 2-cyl., 6-hp. motorcycle. The start was made with the engine cold and the float chamber half filled with gasoline. The change to kerosene, while under way, produced no noticeable difference in the performance of the engine. There was no knocking on grades, no smoke, no odor. The cylinders fired crisply, the pick-up was quick, the firing regular at all speeds, and the power all that could be desired. It is even claimed that, with the new carburetor, a gallon of kerosene will drive the motorcycle and sidecar the unheard-of distance of 98 miles. It is not understood, however, that an official test has been made as yet in support of this statement.



BY COURTESY OF THE MOTOR CYCLE

**The Outward Appearance of the Carburetor Is Not Unusual. Its Performance Is Independent of Heating Arrangements**

## KNOCKDOWN STEEL BARREL SAVES STORAGE SPACE

Of special interest to shippers of various commodities is a patented knockdown steel barrel, the parts of which can be nested into relatively small space when not in use. It is composed of two semicylindrical sections, to one of which the round bottom is permanently fastened. This bottom piece is divided into hinged halves which can be folded together for packing. One edge of each semicylindrical section is tongued and the other is grooved so that to assemble the barrel it is only necessary to fit the halves together and unfold the bottom. No tools are required for this task.

**Knockdown Steel Barrel, the Two Principal Parts of Which Have Edges That are Tongued and Grooved, Making It Easy to Assemble Them without the Aid of Tools**

## DEPOT UNDAMAGED BY SLIDE DOWN STEEP HILL

In changing the position of a large wooden railway station near Moncton, New Brunswick, engineers found it necessary to move the building several hundred feet down a steep incline. In the midst of the operation the cables gave way and the structure tobogganed swiftly downhill. The spectators expected to see the building completely demolished. But to their utter astonishment it was practically uninjured by its sudden descent. It stopped within seven feet of the foundations prepared for it and stood facing in the proper direction.

## GATHERERS OF CLAMSHELLS ENJOY RISE IN PRICES

Along certain rivers in the United States the gathering of clamshells to be used in making buttons has become several times more profitable than it was a few seasons ago, when the price was as low as $16 per ton. This season, on the Cedar River in Iowa, for example, the price at the outset was $37.50 per ton, and in the autumn it had advanced to $60 per ton. This was for unsorted shells, while in former years the shells were sorted. Two men with a motorboat can easily gather half a ton in a day, it is said. Fully 100 tons were collected in one locality, where vats were provided on shore to free them of clams by steaming.

## MOTORISTS PAY WITH AUTO FOR NEGLECT IN FOREST

Appalling forest fires often follow the thoughtless handling of matches or cigarettes, but it is seldom that the careless ones alone suffer so severely as did a party of motorists in a national forest recently. On leaving their six-cylinder car, within sight of a sign urging precaution in handling fire, one of the party threw away a cigarette unextinguished. Returning some time later, they found their car

**Charred Remains of a Touring Car Burned in Fire Started by Throwing Away an Unextinguished Cigarette: A Few Feet from the Spot Was a Fire-Warning Sign Erected by Forest Rangers**

a heap of smoking ruins. Fortunately little damage was done to the surrounding forest.

## FINE HONOLULU HOTEL NOW ARMY Y. M. C. A.

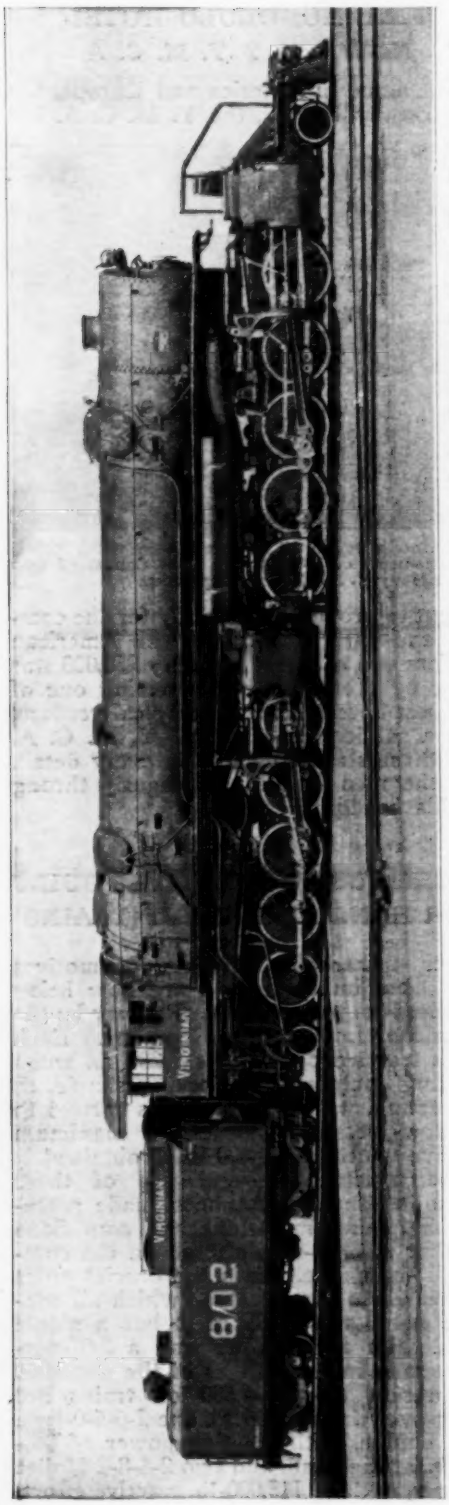
Not alone in America and Europe, but in far-away Hawaii, the Y. M. C. A. has sought to provide abundantly for the comfort and entertainment of the American soldiers and sailors. Recently $50,000 was spent by Honolulu in converting one of its finest hotels, set amid tropical verdure, into a soldiers' and sailors' Y. M. C. A. The fittings are complete in every detail, and the men in uniform eagerly throng to this headquarters daily.

**One of Honolulu's Finest Hotels, Set in the Midst of Luxurious Tropical Verdure, Which at an Expenditure of $50,000 has been Converted into an Army and Navy Y. M. C. A. Headquarters**

## ENORMOUS LOCOMOTIVES BUILT FOR HANDLING HEAVY TRAINS

Ten remarkable Mallet locomotives have been built for, and are now being delivered to, the Virginian Railway by the American Locomotive Company. Each has a tractive power of 147,200 lb. when working compound. Working simple, as in starting, when live steam is carried to the low-pressure cylinders, a maximum tractive effort of 176,600 lb. is obtained.

The construction and use of these enormous engines has been made necessary by increasing traffic and conditions peculiar to a 14-mile stretch on the company's main line. It is the crucial point in the whole system, over which all tonnage must pass. There is but a single track, with five tunnels and a 2.07-percent grade for 11½ miles of the distance. At present 60-car, 4,500-ton trains are taken over the section by one 2-6-6-0-type road engine, with tractive power of 90,000 lb., at the head, and two 2-8-8-2 Mallet pushers, each of 115,000-lb. tractive effort,




One of the Ten Big Mallet Locomotives Built for Pushing Heavy Freight Trains over a Difficult Section of the Virginian Railway; The Engines Are So Ponderous That It Was Impossible to Deliver Them Completely Assembled

behind. These engines give a combined maximum tractive power of 320,000 pounds.

Hereafter, with the new engines in use, 78-car, 5,850-ton trains will be handled. One of the 2-8-8-2 locomotives now used as a pusher, will be placed at the head. Two of the big Mallets, with 20 drivers each, will be put behind as pushers. This arrangement will give a total tractive power of 409,400 pounds.

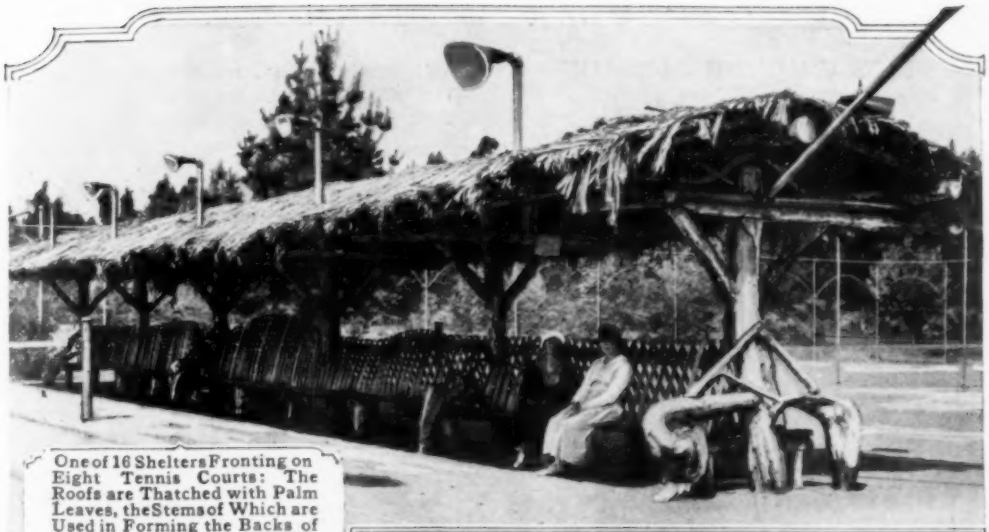
The new locomotives show an increase of 26.6 per cent in weight, 24.5 in heating surface, 61.7 in superheating surface, and 28 in tractive effort, over the 2-8-8-2 type pushers which they succeed and which, in 1912-13, when built, were the world's most powerful engines.

Delivery of the big Mallets from Schenectady, N. Y., to Princeton, W. Va., presented a difficult problem. It was impossible to ship them completely assembled and moving dead on their wheels. The boiler of each locomotive was left on the frames, but trimmed of all outside parts and projections. The cab, low-pressure cylinders, and other parts were removed, leaving a skeleton engine with its tender attached. For each locomotive a flat car, gondola, and box car were needed to carry the parts detached from it.

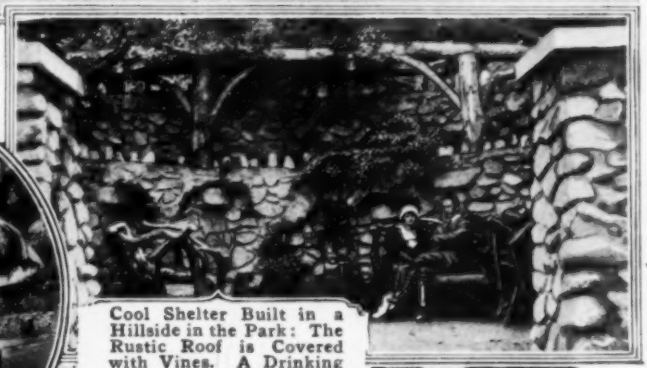
## THATCHED SHELTERS ENHANCE PARK'S ATTRACTIVENESS

Thatched-roof structures of various types now add greatly to the public's enjoyment of a park in Pasadena, Calif., where many months of sunshine each year make very desirable some form of shelter for those seeking outdoor recreation. These protectors from the sun have been designed with regard to their artistic appearance as well as their utility.

Because the scorching rays of the sun will soon harm the finish of an automobile body and ruin the tires, two sheds have been erected, one with stalls for 800 cars and the other with 200 stalls. Racks have also been provided for bicycles. Adjoining eight tennis courts, there are long rustic seats for spectators and players, each sheltered by a wide-spreading thatch roof, the thatch being made of palm leaves. There are 16 of these shelters in all, and on the roofs are lights with reflectors pointing toward the courts, which permit playing at night. Thatched structures of different design, but equally artistic, have been erected above the benches and tables where picnickers eat, while near by are stone stoves.

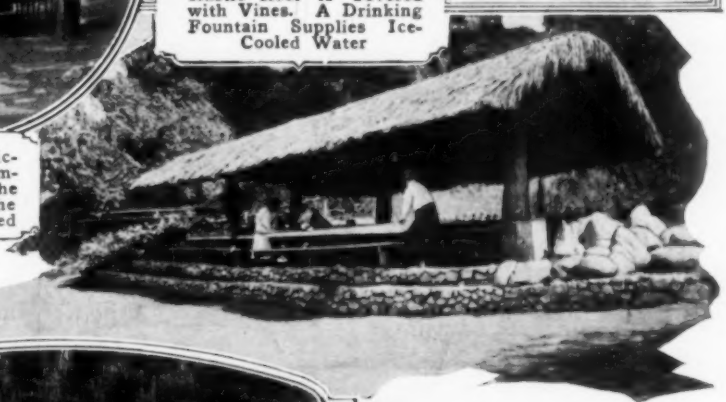


One of 16 Shelters Fronting on Eight Tennis Courts: The Roofs are Thatched with Palm Leaves, the Stems of Which are Used in Forming the Backs of the Comfortable Seats. The Lights, with Reflectors, on the Roof, Illuminate the Courts for Night Playing

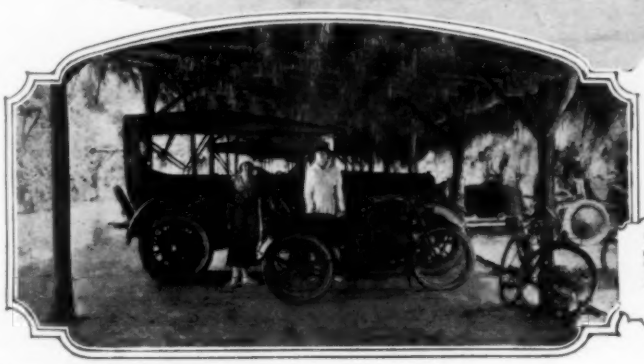


Cool Shelter Built in a Hillside in the Park: The Rustic Roof is Covered with Vines. A Drinking Fountain Supplies Ice-Cooled Water

An Artistic Picnic-Lunch House of Bamboo and Palm: The Stems as Well as the Leaves have been Used



A Shelter for a Picnic Table and Benches That is Quite Different in Design from the One Shown in the Circle



One of Two Automobile Sheds of Which the Public Has Free Use: These Serviceable but Inexpensive Structures Have Stalls for 1,000 Cars

PHOTOS COPYRIGHT, JOHN EDWIN HOGG

## PRIZE-WINNING CABBAGE FILLS WHEELBARROW

A cabbage which would satisfy the desire of the most ardent advocate of intensive gardening was recently exhibited

Remarkable Cabbage Recently Exhibited at a Community Fair in Wisconsin: It Weighed 25 Pounds

at a community fair in Wisconsin. With its immense outer leaves this prize winner more than filled a wheelbarrow. That it was a first-class, compact head is indicated by the fact that it weighed 25 pounds.

## FRESH MARKS ON PAVEMENT PROTECTED BY FRAMES

When it was decided to outline safety zones in the streets of a large city with white lines painted on the pavement, the problem of how to do the work without shutting off traffic presented itself. The difficulty was met by using 4-ft. slat-covered frames having cleats placed on the underside so that only the edges touched the pavement. These were laid wherever freshly painted lines needed protection, except in the case of lines paralleling the tracks, which were guarded by temporary railings.

Street Pavement Marked with Freshly Painted Safety-Zone Boundaries, Which are Protected from the Traffic by Wooden Frames and Temporary Railings

## DISCARDED AEROPLANE ENGINES FOR MOTOR CARS AND TRUCKS

Thousands of high-grade aeroplane engines have outlived their usefulness for flying and been retired. Thousands more will likewise be discarded when their war use is over. What disposition is to be made of them? This question, one that is not infrequently asked, has caused the principal of a Y. M. C. A. school for aeroplane mechanics to suggest that the government may become an important dealer in engines for motor cars. The life of an aeroplane engine is commonly stated to be 100 hours. This does not mean, however, that it is utterly useless after 100 hours of operation. What is meant is that in that period an aeroplane engine gives the "cream" of its service and becomes from 20 to 30 per cent less efficient than when new. It is therefore unsuited for further flying—at least for military flying. But upon being rejuvenated by overhauling, it is valuable in other capacities and capable of use for an indefinite period. It is not surprising, therefore, that the proposal should be made that America's discarded aeroplane motors be salvaged and utilized as automobile and truck motors. There is apparently nothing impracticable in the suggestion, providing the engines could be successfully reassembled into units of fewer cylinders and less horsepower. It goes without saying that motorists in general would not want to buy gasoline for 450-hp. Liberty motors installed in their family touring cars.

## HIGH - POWER MOTORCYCLES USED AS INDUSTRIAL TRACTORS

New duties have been found for motorcycles in Honolulu. Three 18-hp., twin-cylinder machines are being used as industrial tractors in a large pineapple cannery. This peculiar adaption of the motorcycle was inspired by labor short-

The Picture Above Shows How Motorcycles are being Used in a Honolulu Pineapple Cannery as Industrial Tractors. Three Machines Do Work That Formerly Required the Services of 24 Men

age, due to the military draft. And now that the scheme has been given a thorough tryout, some interesting discoveries have been made. The motorcycle trio accomplishes work formerly demanding the services of 24 men. The machines do the work at less than one-tenth the previous cost, and with twice the speed and efficiency. They are used for pulling trains of loaded trucks from the factory's cooling floor to the warehouse, a distance of a fifth of a mile. They have been geared to a ratio of 25 to 1 in low, and 10½ to 1 in high. Each has a hauling capacity of 4½ tons.

## RECOVERING SULPHUR FOUND IN COAL MINES

The present scarcity of sulphur, a much-needed war material, is being relieved by concentrating the pyrite which is to be found in coal mines in Illinois, Ohio, West Virginia, and other states. In some instances the sulphur in this mineral has assayed more than 42 per cent. Besides relieving the present shortage, the recovery of sulphur in this manner promises to add materially to the income of the coal mines and make the importation of sulphur unnecessary.

¶A resolution has been adopted by the Merchants Association of New York recommending that all goods manufactured by its members in this country be marked "Made in the U. S. A." in plain type, and that all other marks intended to identify the country of origin be discontinued.

## SANDBAGS A SUBSTITUTE FOR INDIAN CLUBS

New exercisers for home and gymnasium use which can be employed in place of either dumb-bells or Indian clubs consist of long, slender sandbags of any desired weight, which are made of durable fabric and provided with rope handles at either end. On the sides are loops of webbing into which the feet can be inserted for leg exercises. Besides serving the purpose of several types of exercisers, it is pointed out that the sandbags are preferable to Indian clubs and dumb-bells in that they can be used noiselessly.

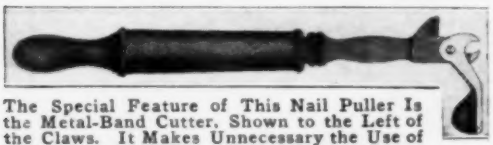
## JAPANESE SWORD PRESENTED TO PRESIDENT

As a token of respect and good will the Japanese government has presented President Wilson with an antique Nipponese sword. The ancient weapon, quaintly ornamented, is one of a number of historical swords selected as gifts for President Wilson, King George, King Albert, President

Poincaré, and King Emmanuel. The presentation was made in October at the White House by one of Japan's foremost editors on an official visit at Washington.

## IMPROVED NAIL PULLER HAS BOX-STRAP CUTTER

A nail puller for opening boxes and crates has been improved by the addition of a metal-band cutter which projects



**The Special Feature of This Nail Puller Is the Metal-Band Cutter, Shown to the Left of the Claws. It Makes Unnecessary the Use of an Extra Tool in Opening Metal-Bound Boxes**

from the side just above the claws at the lower end. Because of the low grade of lumber now much used in box making, strap iron is used as reinforcing much more than formerly, and the cutting member referred to is a great aid in opening boxed or crated shipments.

## MILL'S TRACTOR HAULS LOADS FOR SEVERAL FARMERS

In southwestern Colorado, where alfalfa is grown in large quantities and shipped to mills which use it in preparing an alfalfa meal for commercial purposes, a new plan of doing hauling with tractors has been developed. When a farmer has a load of alfalfa ready to be made into meal, he hauls it to the nearest road or lane, leaves it there, and notifies the mill. When four or five loads are ready in the same neighborhood, a tractor is sent out which picks up the loads one at a time, forming a train that is hauled to the mill with far less labor than if each farmer hauled his own.

## BIG REDUCTION IN ACCIDENTS AT WESTERN SHIPYARDS

Adoption of an interesting safety-first system in the steel shipyards of the Pacific coast has decreased personal accidents 75 per cent and effected a 40-per-cent reduction in insurance rates. The plan virtually makes every workman an inspector. On each tier of scaffolds are blackboards. When an employe sees a loose bolt, a misplaced tool, a weak plank, or anything else that might subsequently cause the injury of some fellow workman, he writes a memorandum of it on the nearest blackboard. It then comes to the attention of a safety-first man who investigates the condition and has it remedied immediately. When an inspector finds a tool that has been left in a dangerous position, he marks it with a white cross, finds the workman who mislaid it and explains to him how the safety of his fellows has been jeopardized. Receptacles have been provided for extra bolts and rivets so that there is no excuse for leaving them where they might fall and strike some one below. When a workman climbs a tall ladder, his tools are hoisted for him so that his hands are left free. Lastly, the whole plan has the indorsement of the labor unions, and members who fail to follow its rules may be suspended.

¶A pipe organ in Shanghai, China, which has long been an object of interest because it has pipes of bamboo, after having been in use 50 years, is about to undergo alterations. Metal pipes will be substituted for the bamboo. It is said that this instrument, while not in perfect tune, produces surprisingly sweet, soft notes. It is considered remarkable that the builders could have produced such fine results with such unsatisfactory material.

**Tractor Train Composed of Several Loads of Alfalfa to be Made into Meal at the Mill: The Tractor is Furnished by the Mill and Makes Trips into Surrounding Country Periodically to Pick Up the Loads Which the Farmers Leave at the Roadside**

# MINING OIL FROM SAND REEFS

By O. J. GRIMES

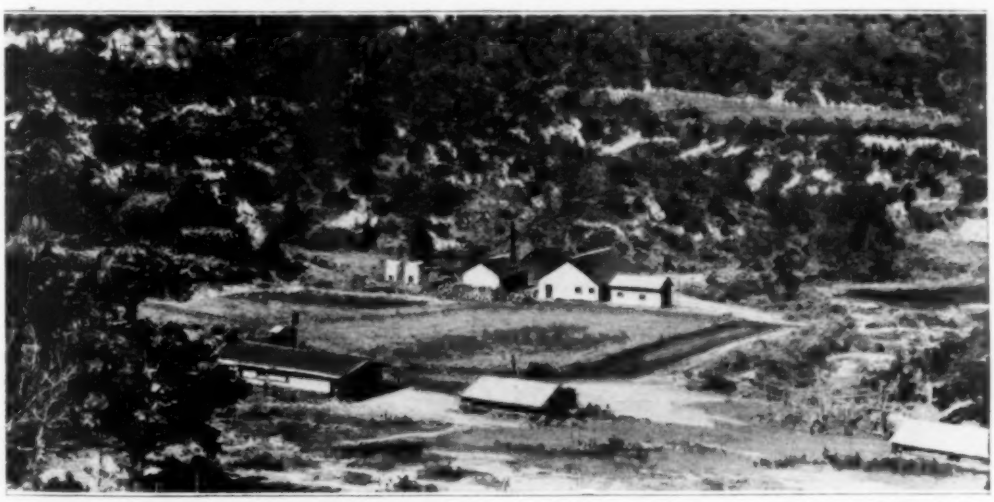
THE urgent appeal of the government for a greater production of petroleum to meet the demands of war has stimulated activity in all oil fields of the country, but probably in no other district have such unusual methods been employed to gain production as in the Uintah basin. This basin is situated partly in Utah and partly in Colorado, is isolated from the outside world in so far as transportation is concerned, and is the home of the remnants of the once powerful Ute Indian tribes.

Tunnel in the Side of a Mountain So Saturated with Oil That It Drips from the Roof and Oozes from the Sides of the Bore

Men of Utah and Colorado are not wont to boast of any special training in the oil industry, but they are proud of the achievements of their states in the mining world, and it was no more than natural, probably, that they sought to obtain oil production by the application of mining methods—by driving tunnels instead of wells. The Uintah basin now can boast of two oil mines. One, situated near the headwaters of Whiskey Creek, in Colorado, a few miles from the Utah line, already is producing oil by the tunnel method. The other oil mine is near the Whiterocks Indian school, in Utah, and is rushing work as rapidly as possible to get on a producing basis.

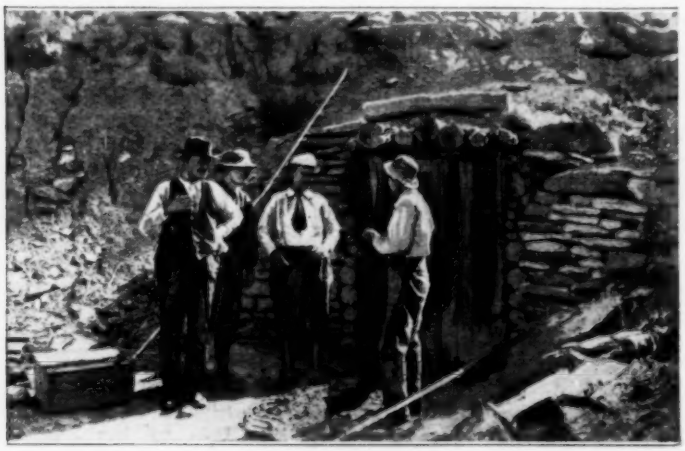
In driving the tunnel to tap the oil sands in the Whiskey Creek country the owners of the property were guided to some extent by the knowledge gained in the driving of a well farther up on the mountain. Four strata of oil sands were penetrated. Then, too, there was an oil spring in a cañon on the property.

The original tunnel was driven into the mountain a distance of about 200 ft. before the better-producing sand was tapped. The oil flows from the sand into a



The Refinery in Whiskey Creek Cañon, Erected to Take Care of the Oil Which Flows from a Vein of Sand Tapped by a Tunnel: The Crude Oil is Conveyed by Gravity through a Pipe Line to This Plant

sump in the mine, from which it is pumped into a pipe line and conveyed by gravity to the little refinery erected at the base of the mountain. The average production from this tunnel is about 10 bbl. a day and the capacity of the refinery is about 30 bbl. of crude oil a day, but can be doubled with but little effort and expense. A second tunnel, lower down on the mountain, has been started and is now in about 150 ft., and a much heavier production has been obtained, which will furnish enough crude oil to work the refinery to capacity.



**Mouth of the Tunnel in Which Oil is Collected in a Sump and Pumped into Pipes That Lead Down to the Refinery: The Average Production Is 10 Barrels per Day**

The oil is as unusual as the method employed in procuring it. It is of an extremely heavy paraffin base and is without any of the lighter volatiles, such as gasoline and kerosene, making it adapted only to the production of the highest grades of lubricants.

The oil mine at Whiterocks is an entirely different proposition; it is a mountain of oil sands, forced upward in the upheavals which formed the Uintah Mountains, and no effort is being made to obtain production by flow. Short tunnels have been put into the mountain at different places to prove up the body of sand, just the same as miners prove up the ore bodies in a mine. That the sand is saturated with petroleum is indicated by the fact that oil seeps from the roof and sides, and oozes from the bottom of the tunnels steadily.

The Whiterocks enterprise includes the erection of a plant to extract the oil from the sands, or rather to wash the oil from the sands. A process has been devised and given exhaustive tests at the University of Utah and is to be employed in the Whiterocks plant. The sand is to be crushed, washed with gasoline and hot crude oil, and then run through a drying room where the remaining oil in the sand is vaporized and recovered by condensation. The oil thus recovered is the same as the crude obtained from wells except that some of the free gasoline has been taken off during the treatment. Tests made to date indicate that the sand mountain will yield from 25 to 30 gal. of crude oil to the ton of sand, and it is possible that the yield will increase, as the farther the mountain is penetrated, the more heavily charged the sands appear to be. The oil tests about 29.5° Baume, and analyses indicate that its base contains about 54 per cent paraffin and about 36 per cent asphaltum.

The mountain of sand which is to be mined is the same as the sands which are sought by drills throughout the country. In this instance, however, nature has brought the sands to the surface. While some loss may have been suffered by evaporation in the case of the lighter volatiles, still the greater part of the oil supply has been preserved by nature's own peculiar processes. When the hot summer days reduce the viscosity of the oil and it seeps to the surface it is immediately coated with fine dust and the pores of the sand exposed to the air are hermetically sealed.

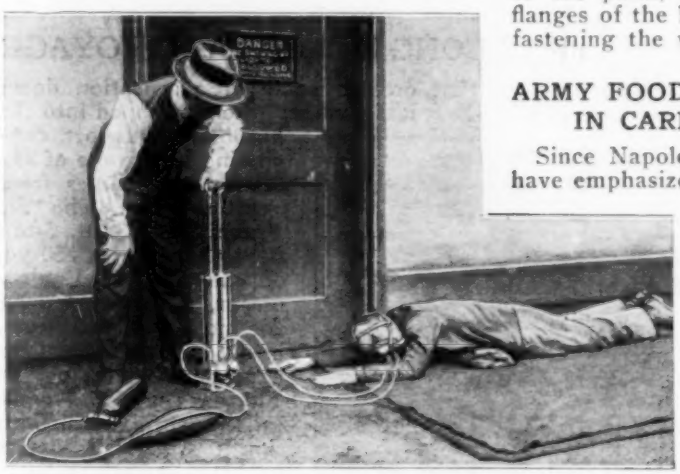
The West is especially fortunate in the matter of oil sands. Besides several big deposits in the Uintah basin, probably the largest deposit of saturated oil sands on the continent, if not in the world, which has been brought to the surface by nature, has been discovered in the San Rafael country, in southeastern Utah. The great oil-sand reefs are exposed there for many miles, but as yet very little has been done to develop this resource because of its isolation from the outside world. The region where the sands are situated is approximately 125 miles from a railroad, by the roads now in use, and is reached only by crossing a desert. However, interest in the proposition has been aroused recently; new highways are being constructed, water wells put down along the highways, and plans are being formulated for active development of the oil-sand deposits.

## WORLD'S LARGEST HOTEL FOR SHIP WORKERS

To the "world's-largest" list, which has grown rapidly since the beginning of the great war, may now be added what is said to be the world's largest hotel. This institution was established in Philadelphia for the benefit of Hog Island ship workers and their friends, and contains 2,175 rooms, all of which have an outside exposure. The furnishings, while not elegant, are substantial and attractive. There are a number of recreation rooms in which are mission rockers, writing desks, and reading tables supplied with a variety of magazines. In each dining room are 60 tables, each seating eight persons. The linen, silverware, and glassware are of good quality, and a staff of experienced hotel men are in charge.

## NEW OXYGEN APPARATUS FOR GAS VICTIMS

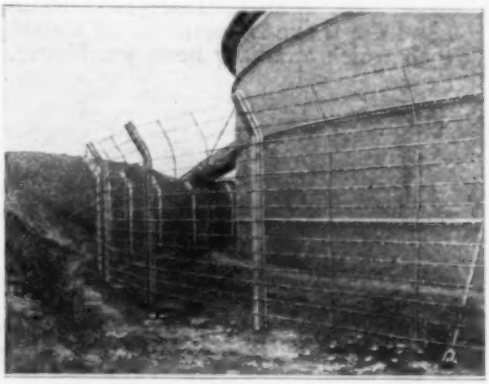
Since the invention of special apparatus for resuscitating persons overcome by gas, equipment of this sort has made possible so many remarkable rescues that its use has become widespread and improvements in design have been frequent. One of the latest outfits is shown herewith. A two-cylinder pump is employed in forcing pure oxygen, obtained from a small steel cylinder, through rubber tubes into the lungs of the victim, a mask being fastened over the face of the stricken person to insure the proper delivery of the oxygen into his system.




**Reviving a Man Overcome by Gas: The Pump, Which Resembles an Automobile-Tire Pump, is Used in Supplying the Victim with Pure Oxygen Obtained from the Small Cylindrical Container on the Floor at the Left**

## HIGH BARB-WIRE FENCE HAS STEEL RAILS FOR POSTS

A barb-wire fence so strong that it would check the progress of a fighting tank, were one to attempt to push through it, has been erected about a large reservoir of a western water company. The fence is 10 ft. high, and railroad rails set in concrete bases serve as posts. These are bent outward at an angle at the top. Fifteen strands of barb wire are fastened to the posts, holes being drilled in the flanges of the latter to provide means for fastening the wires in place.



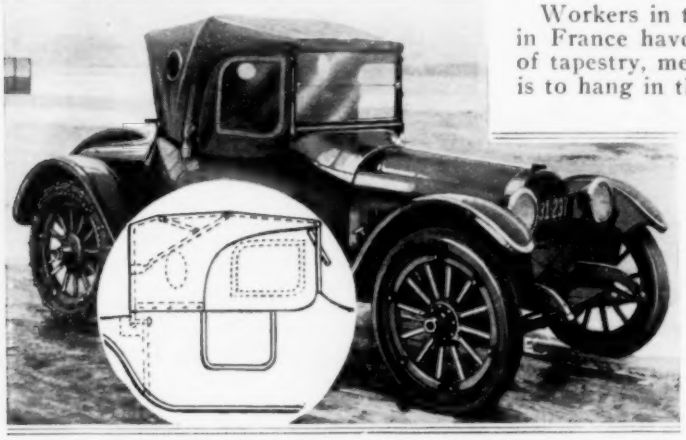
**Fifteen-Strand Barb-Wire Fence, with Steel Rails for Posts, Erected about a Reservoir of a Western Water Company**

## ARMY FOOD HERE AND ABROAD IN CARE OF SCIENTISTS

Since Napoleon's time military experts have emphasized the importance of keeping an army well fed, but in the present war, rationing has been reduced to a science. In the American army, the surgeon-general's office has what is known as the Nutrition Section, which determines the nutritive quality of army rations and devises means for preserving army food scientifically. Several of these officers are assigned to the camps in this country, while 29 have recently been sent abroad to undertake similar work. Being familiar with Americans' tastes, it is often possible for them to suggest changes that add to the attractiveness of the rations, while at the same time proper balance in food values is maintained.

## REMOVABLE MOTOR CAR TOP FOLDS UP COMPACTLY

An automobile top has been devised which can be quickly removed and folded into small space for carrying. It is covered with suitable waterproof material and the frame is composed of a main bow to which auxiliary bows are hinged. Straps extending from the frame to the windshield help support the covering. Each bow is composed of overlapping parts, making it adjustable to the desired size, and is also hinged in at least two places, in order that it may be folded compactly.



Automobile Equipped with a New Removable Top of Simple Construction Which can Easily be Folded into Small Space for Storage under the Seat, or E sewhere

## FRANCE GIVES TAPESTRY TO PHILADELPHIA

Workers in the famous Gobelin factory in France have begun fashioning a piece of tapestry, measuring 15 by 21 ft., which is to hang in the museum in Philadelphia —a gift from France to the Quaker City. The prized fabric will depict with color and animation the departure of American troops from Philadelphia for Europe. Three panels will contain these phrases from President Wilson's messages: "Right is more precious than peace," "We have no selfish end to serve and desire no conquest and no domination," and "We shall fight for democracy."

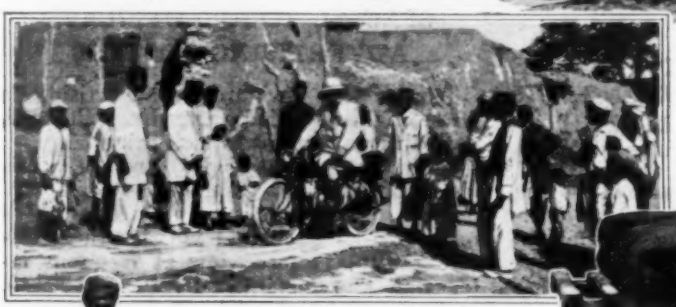
## ROVING SCHOONER STARTS LONG HOMEWARD VOYAGE

In mid-October the two-mast auxiliary schooner "Sir Francis" put out from Eastport, Maine, for southern waters. The vessel, manned solely by its owner, whose name oddly enough is Drake, is the one that created some little sensation down East last summer when it slipped into the harbor at Eastport, concluding its voyage of 25,000 or more miles from Seattle, Wash. The "Sir Francis" is a 32-ft., 5-ton boat that carries 750 yd. of canvas. Its English owner, a seafaring man for most of his 55 years, is out sight-seeing. He expects to winter on the Florida coast and early in the spring sail into South American waters on his way back to Seattle via the Horn. He left the latter port for the east coast July 28, 1915. After visiting many ports from Washington to Central America, he went through the Panama Canal, visited the West Indies, touched Florida, called at the Bahamas, and then headed for the Maine coast.

Captain Drake on the Deck of the "Sir Francis" before Setting Sail for Florida: The 32-Foot Schooner Has a Cabin, 10 by 12 Feet in Size, and Carries a Small Dinghy at the Stern

# SOME TRAVELS OF MISSIONARIES IN INDIA

Although the Picture Above Looks Not Unlike Some Rural Barnyard Scene, It Shows a Native Circuit Rider Entering a Village on His "Preacher" Pony. The Photograph at the Side Shows Native Religious Workers on Their Way to a District Conference via Camel Wagon. Luggage is Borne in the Upper Compartment



The Scene Above Is Perhaps Not So Picturesque as the One at the Top of the Page, but This Circuit Rider Preferred a Motorcycle to a "Preacher" Pony

The Pushcart Bears Not Spices of the East, but 30,000 Copies of Religious Tracts, Texts, and Similar Printed Matter for a Missionary

The Missionary's Motorcycle in the Care of Admiring Natives on a Bank of the Ganges, One of the Points Visited during a 400-Mile Overland Trip

In the Interior of India a Motor Car Is Not So Commonplace as in New York or Chicago and Therefore Is an Object of Great Wonder and Admiration among Villagers

## SOLDIERS SIGNAL AUTOISTS WITH NEW SEMAPHORES

Semaphores having several arms bearing such inscriptions as "Down Town," "To Camp," are being installed by a public-spirited business organization on thoroughfares in and about Los Angeles for the benefit of soldiers and sailors stationed in the vicinity. They constitute what is called the "Soldiers' and Sailors' Auto Courtesy Signal System" and afford a much appreciated means by which men in uniform can ask for a lift from passing motorists.

**One of the Semaphores Erected in and around Los Angeles with Which Soldiers and Sailors can Ask Passing Autoists for a Lift: Different Arms Indicate Different Destinations**

## COOPERATIVE HOUSING FOR DANISH WOMEN

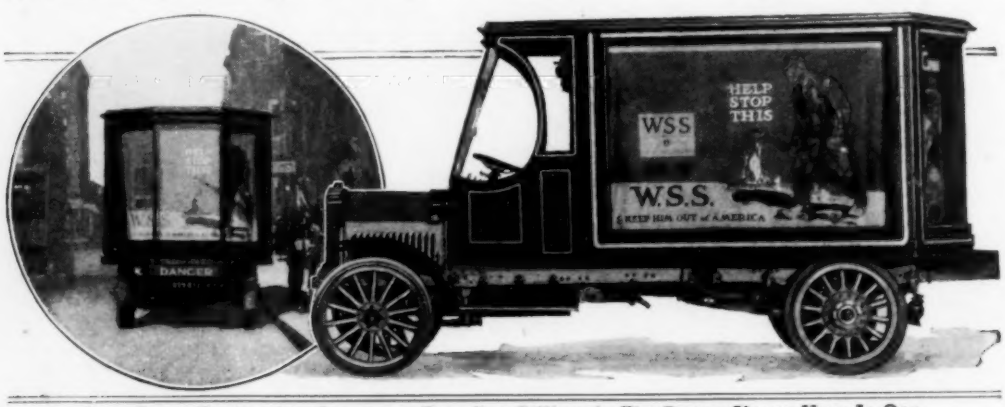
Plans are being made for an interesting undertaking in coöperative housing for women, in Copenhagen. It is proposed to erect a large house containing 135 separate rooms, five two-room apartments, and 10 studios for artists—all of these to be placed at the disposal of women earning their own living. Each resident would own a share in the undertaking, according to the plan, and would have access to the common dining room or could have meals delivered to her apartment by means of a lift.

## MEDALS IDENTIFY MEMBERS OF FRENCH PARLIAMENT

The designs of medals for members of the latest French parliament which have recently been made public call attention to an interesting practice by that legislative body. It appears that each member is presented with a medal which serves both as an identifying piece and as a souvenir. On one face of these new medals is a striking medallion of a female figure representing France and on the other side is engraved the name of the holder and of the department which he represents.

## SPECIAL TRUCK DISPLAYS ADVERTISING POSTERS

A new idea in outdoor advertising is what might be called a traveling billboard, consisting of an auto truck provided with a body having glass sides through which changing posters, displayed within, can be seen. The advertisements are mounted on a revolving curtain which brings different displays into view at frequent intervals. The curtain is driven by a ¼-hp. motor connected with storage batteries which also supply current to lamps that illuminate the posters at night. The unusual character of the truck and the fact that the posters revolve, naturally attract much attention to the advertisements.



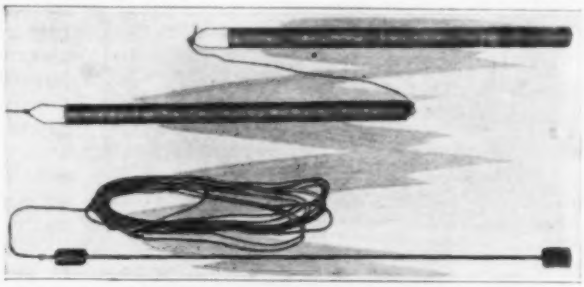

**Auto Truck Equipped to Serve as a Traveling Billboard: The Poster Shown Here Is One of Several Mounted on a Revolving Curtain**



the convenience of the automatic record British armies. Marked progress is hei

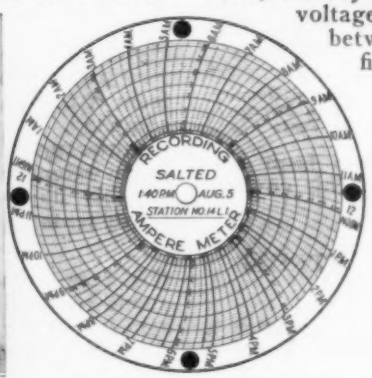
# MEASURING WATER RESOURCES ELECTRICALLY

More or less interest is attached to a method lately demonstrated by the United States Geological Survey for measuring the flow of an underground watercourse. The plan is worthy of notice because of its practical value, rather than on account of any new discoveries it involves. Essentially it consists of the application of known electrical principles and the use of simple apparatus. The advantage of the scheme is that it enables a fairly accurate estimate to be made of the potential capacities of wells before they are actually established and expensive machinery installed, thus obviating guesswork and the likelihood of very costly disappointment.



The Perforated Tubular Buckets in Which the Electrolyte is Placed are Shown at the Top, While Below, with Wire Connected, Is One of the Four-Foot Electrodes

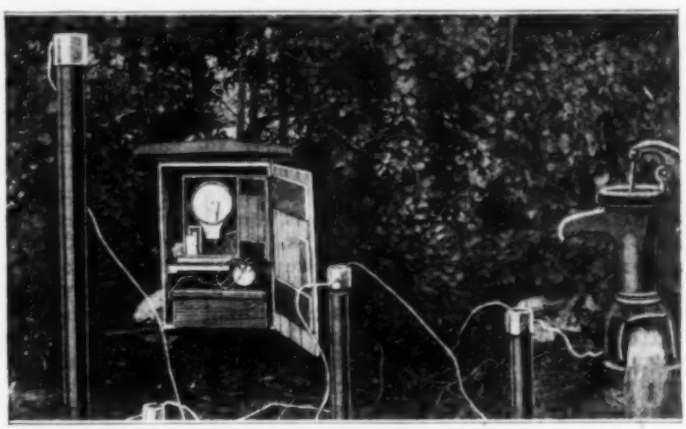
Two or more test wells are driven close together in line in a place known to possess water resources. Electric connections are made with the well casings. The downstream bore is fitted with an electrode four feet long and insulated from the tubing by means of wooden spools. An insulated wire connected with it communicates with the surface. An electrolyte, such as sal ammoniac, is placed in the upstream, or No. 1, well. As it is absorbed by the water and carried downstream, an excellent conductive medium is gradually established so that the current flow between the wells rises. When the electrolyte in its maximum strength reaches the lower well, or wells, a short circuit is effected between the casing and the internal electrode of the latter, thereby causing an abrupt rise in voltage. The time that elapses between the charging of the first well and the arrival of the electrolyte at the lower one, indicates the velocity of the water current. This, obviously, forms a basis for other calculations.




Left: The Commutator Clock is Set to Make an Electric Contact Every Five Seconds and, When Used in Connection with the Recording Ammeter, Obviates the Necessity of Personal Supervision of the Tests. Right: One of the Disk-Shaped Charts on Which the Ammeter Readings are Automatically Recorded by a Stylus

By employing a recording ammeter and a commutator clock, a series of wells may be tested and the readings registered automatically. Otherwise it is necessary for operators to be in attendance throughout the whole course of the observations.

One plan, however, gives as accurate results as the other. The only difference is



The Cabinet in the Background Holds a Recording Ammeter, a Commutator Clock, and the Batteries. In the Foreground Are Test Wells

the convenience of the automatic-recording outfit as contrasted with the comparative cheapness of the direct-reading

**The Direct-Reading Apparatus, Here Shown, Requires the Presence of an Operator Once Every Hour during the Course of the Tests**

apparatus. The scheme has been employed successfully both in this country and Canada.

## WAR AWAKENS INDUSTRIES IN INDIA

One of the countries to experience a great industrial awakening during the war is India, which suddenly found itself thrown on its own resources for many things formerly imported, and confronted with the task of sending supplies to British armies. Marked progress is being made in tanning, vegetable tanning materials being supplanted in many places by chromium compounds such as American tanners use. Before the war there were 60 jute mills, while in 1918 the number had increased to 74, and the export of gunny sacks had more than doubled. Similar activity was present in cotton weaving and is destined to continue. Production rose by more than 500,000,000 yd., or nearly 50 per cent above the pre-war average.

In the matter of electrical development India has been exceedingly slow. This is illustrated by the fact that there are only a few miles of single-track electric road in the country. Nevertheless there are many projects for greater use of electricity under consideration. These include power plants in spinning mills, and greater use of electric fans and electric lights. Thirty-four mills in Bombay are now under contract to use electric power from a certain large hydroelectric-power company. The war has brought about the manufacture of shells, rivets, nuts, etc., on an extensive scale. Keeping pace with all this development are proposed improvements in the banking facilities.

¶A new form in which foodstuffs are about to be placed on the market by a concern in the state of Washington consists of bricks of compressed fruit or vegetables. It is said that laboratory tests have proven that food put up in this way retains its flavor and food properties and can be shipped to any part of the world.

## SCORES KILLED IN BROOKLYN RAPID TRANSIT WRECK

Eighty-nine passengers were killed and more than 100 others injured recently when a crowded five-car train on the Brighton Beach line of the Brooklyn Rapid Transit Company was wrecked. Running at terrific speed, reported to have been as great as 60 or 70 miles an hour, the train left the track on a curve at the mouth of the Melbone Street tunnel in Brooklyn. The lead car smashed against the concrete wall that separates the north-bound from the south-bound tracks and was thrown across the tunnel entrance. The following cars battered through it and smashed their way into the underground passage, scraping and lunging against a series of steel pillars. The passengers jammed in the first car were slaughtered. Many of those in the second and third cars who escaped death were imprisoned beneath a mass of wreckage. Persons in the last two cars met with good fortune, for, although shaken, their escape was comparatively easy. Rescue work was long delayed for unapparent reasons. Fully a half hour elapsed before police and firemen reached the scene. Their work was seriously hampered because the wreckage practically sealed the tunnel and made access extremely difficult. The derailment occurred shortly before seven o'clock in the evening, but it was midnight before the bodies of all of the dead had been recovered. The tragedy crowned the events of the first day of a strike called by local trainmen. Piloting the ill-fated express was a substitute motorman.

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Loading the Dead and Dying into Waiting Ambulances after a Fatal Wreck on the Brighton Beach Branch of the Brooklyn Rapid Transit Lines Recently

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Searching for Victims Amid the Débris: The Wreck Occurred When a Five-Car Train Jumped the Track and Crashed against the Walls of the Melbone Street Tunnel in Brooklyn, near Prospect Park

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Gathering the Clothing and Personal Effects of the Victims After the Latter had been Removed: Eighty-Nine Persons were Killed and More Than 100 Others Injured

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View of the Hog Farm Established near One of Our Army Camps for the Utilization of Garbage and Waste from the Kitchens

## SOLDIERS LUG HEAVY SALVAGE REARWARD FROM LINES

As might be imagined, the task of salvaging the waste war materials that litter the battle fields is an immense one that entails much effort. It is being considerably facilitated, however, by a practice that has been in force for some time. Orders have been issued and conspicuous signs erected at the front directing men to bring salvage with them when returning from the lines. And they do

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A Heavy Piece of Salvage, Apparently a Sheet of Corrugated Iron, being Carried Rearward by Two Tommies Returning from the Lines

so. All of which goes to show that those of us who stay at home have no patent on the war-time slogan, "Save."

## HOG RANCH IS ARMY CAMP'S GARBAGE-DISPOSAL PLANT

Perhaps never before in the history of America, not to say the world, has the conservation of material, and the salvage of unavoidable waste, been practiced so consistently and generally as during the war period. Consider, for instance, the action of the commandant of one of our training camps who realized that the true spirit of conservation is utilization. He established a well-planned hog farm near the camp so that the waste from the army kitchens might be profitably utilized. It is hardly necessary to mention that a plan of this kind represents a twofold saving, for in addition to changing loss to profit, it eliminates most of the trouble and expense otherwise involved in garbage disposal.

## STARS IN SHIPYARDS' FLAGS TO NUMBER LAUNCHINGS

Each time a shipyard flying an official flag of the United States Shipping Board launches a vessel, it is entitled to add a star to its banner, according to a recent ruling. The stars must be five-pointed, of red bunting, and one-half the size of the lettering used in the words "U. S. Shipping Board." The manner in which the stars are to be arranged is also specified. The addition of stars is left entirely optional with each yard.

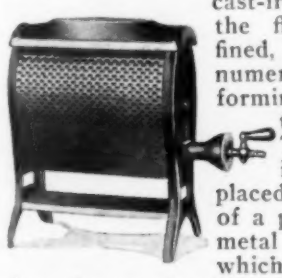
## DESERT HIGHWAYS GLEANED FOR RED CROSS JUNK

The Los Angeles chapter of the Red Cross recently carried out a most profitable idea in the form of a junk-salvaging expedition along the motor highways of the Mojave Desert. Motorists have been making use of these roads for years, and because of their exceedingly rough nature, they are unusually hard on tires. Bumpy roads and desert heat are conducive to blow-outs, and as a result the desert became strewn with old casings and tubes that were past redemption by means of repair. Then came the shortage of rubber with the resultant high market price paid for old rubber in any form.

Taking advantage of these conditions, the local chapter of the Red Cross sent two patriotic citizens, who donated their services and the use of a motor truck, into the desert. Going east over the Santa Fe Motor Trail they picked up 127 old tires in the 305 miles between Los Angeles and Needles. They also picked up 1,321 beer bottles and nearly half a ton of old motor parts that had been abandoned along the highway. By arrangement with the Santa Fe Railway, all of this junk was loaded into a box car at Needles and shipped to Los Angeles free of charge. The truck then returned to the city via Yuma and the Borderland Trail, gathering up 176 more tires, 1,200 bottles, two wrecked automobiles, and a capacity load of miscellaneous salable junk. The proceeds of the expedition turned nearly a thousand dollars into the till of the Red Cross.

## EFFICIENT GAS HEATER HAS SAFETY FEATURES

A gas heater for which exceptional heating powers are claimed has a perforated cast-iron core in which the flames are confined, the burner with numerous raised tips forming the base of the hollow core. This whole heating element is placed in the center of a perforated sheet-metal guard, through which heat radiates when the core becomes red-hot. A draft will not blow out the flames, it is said, and articles cannot come in contact with them.



## INVALID SOLDIERS TREATED IN CHAIR HOISTS AT BATH

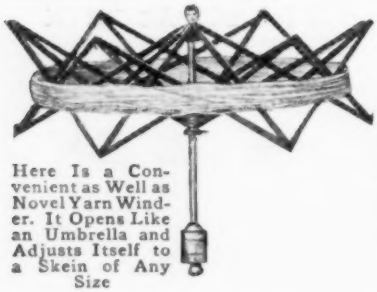
Many sick and wounded soldiers are sent to Bath, the English health resort in Somersetshire, renowned for centuries be-

**Chair Hoist Used to Facilitate Handling Invalid Soldiers under Treatment at Bath, the Famed English Health Resort in Somersetshire**

cause of the curative properties of its mineral springs. To facilitate the treatment of those who are very weak or badly crippled, and therefore difficult to handle, a chair hoist, which enables a patient to be lowered into the water and withdrawn from it readily, is employed. It will be recalled that the origin of Bath antedates the birth of Christ by 863 years, and that the value of the waters there was later recognized by the Romans during their period of occupation. Traces of radium have been found in the springs, and the gases are said to contain argon and helium.

¶A saving of unnecessary consumption amounting to 15 cents a day by one hundred million Americans would mean a saving of $5,475,000,000 a year. A saving of 15 cents a day per family would mean roughly one billion dollars a year. The Thrift and War Savings stamps give us the facilities for transferring these little savings to the government without inconvenience or trouble.

# SOME NOVEL AND LITTLE-KNOWN ACCESSORIES



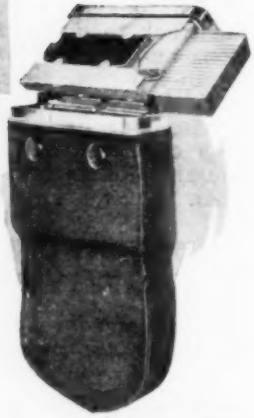
Here Is a Convenient as Well as Novel Yarn Winder. It Opens Like an Umbrella and Adjusts Itself to a Skein of Any Size

White-Rubber Drinking Cup Supplied with a Flat Khaki-Colored Case: A Serviceable Article for the Soldier, Outer, and Traveler

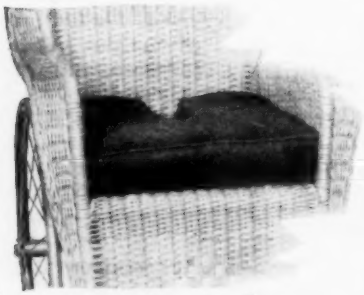
Those Who Knit While Motoring and Commuting will Appreciate the Attractiveness of This Black Satin Bag with Its Silver Bracelet and Yarn Holder

Those Who Work at Paper-Littered Desks and Use Fountain Pens Many Times Daily will See the Good Features of This Upright Holder

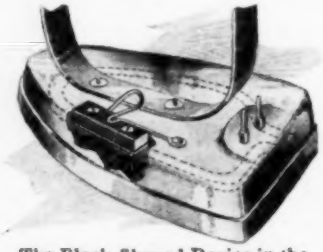
New Type of Portière Hanger Consisting of Grooved Strip in Which Wooden Balls, with Suspended Pins Attached, Are Free to Slide: The Arrangement Eliminates the Old-Fashioned Pole



Especially Designed for Soldiers and Sailors Is the Tobacco Pouch Illustrated Above. It Is Waterproof and Dustproof and Has Compartments in the Top for a Box of Matches and a Package of Cigarette Papers. The Bag Is Available Both in Khaki and Navy Blue

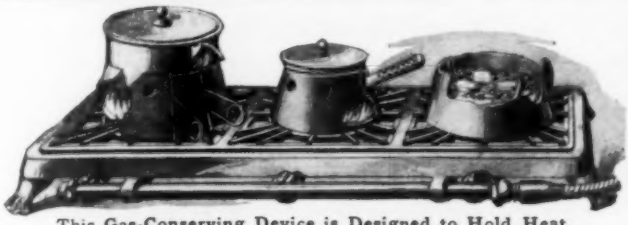


The Invalid's Cushion Here Shown is Made of Layers of Felt and Springs. The Cut-Away Portion Relieves Pressure on the Spine



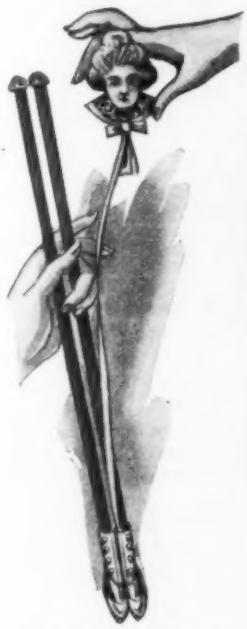
The Block-Shaped Device in the Cut-Away Section Is a Fusible Controlling Bridge Which Prevents the Flatiron from Overheating. If the Coil Radiates Excessive Heat, the Controller Melts and Shuts Off the Current

# INTENDED FOR THE HOME AND ITS MEMBERS



This Gas-Conserving Device is Designed to Hold Heat around the Sides of a Cooking Receptacle and Prevent Needless Waste. It is Claimed, for Instance, That by Using the Contrivance, 2 1/16 Cubic Feet of Gas are Saved in Heating a Gallon of Water to the Boiling Point

As This Cover is Raised, It Tilts to One Side, Draining into the Vessel, and Then Turns Completely Over So That When Laid on a Table Its Moist Side Is Up

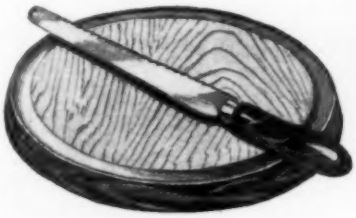


Distinctive Holder for Knitting Needles: An Elastic Cord Connects the Shoes and the Headpiece

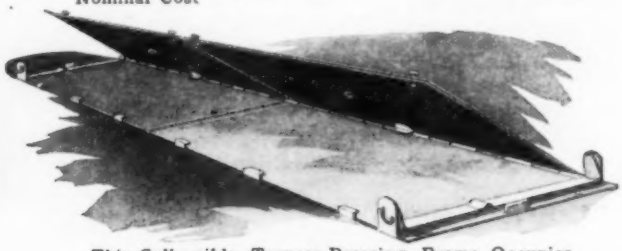
For Purifying and Filtering Drinking Water, This Electric Apparatus is Said to be Proficient. The Water is Chlorinated, but without Leaving a Chlorine Taste or Odor. The Receptacle Is of Two-Gallon Capacity and Operates at Nominal Cost

Pocket-Size Check Protector with Rollers Placed Longitudinally, Enabling Full Length of Check to be Perforated in One Operation

One of the Good Features of This Novel Ash Tray Is That Its Contents Are Not Liable to be Scattered by a Draft of Air



The Painted Decorations on This War-Time Bread Board and the Knife Are, Quite Ironically, of Golden-Colored Wheat



This Collapsible Trouser-Pressing Frame Occupies Little Space in a Trunk and is Intended to Enable a Traveler, or Other Person, to Keep Such Garments in Good Condition without the Services of a Tailor. The Pressing is Accomplished by Pressure, and No Heat is Required

## WINTER WEAR FOR AMERICAN SOLDIERS IN SIBERIA

In addition to their regular heavy overseas equipment, the American soldiers now in Siberia have been given special outfits of clothing which make them look like explorers bound for the north pole. Each outfit includes a cap of muskrat fur, costing $12, and a coat of heavy moleskin cloth lined with fur and having enormous pockets. The shoes are made of cowhide like Canadian moccasins, and are worn with heavy lumberman's socks, while the fur gauntlet mittens are lined with blanket cloth and cost $16.50 a pair. Like children's mittens they are connected with a stout cord, which prevents their being lost when removed for shooting.

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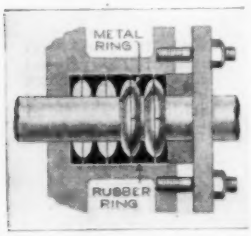
## METALLIC PACKING IS HELD BY RUBBER RINGS

Interesting claims are made for a metallic packing that is composed of a series of frictionless babbitt and composition-rubber rings. The former members are segmented and held together by a light copper wire. This leaves a small space between each of the sections so that provision is made for wear. Also, the metal rings are made flat on one side and rounded on the other. The flat sides are placed together. The rubber rings are tapered on the inside so as to fit the metal ones snugly. Slight pressure upon the glands causes the rubber rings to force the metallic ones firmly against a rod or piston. The rubber, however, does not come in contact with the latter. The packing is made to fit any stuffing box and is claimed to serve for long periods without leaking or requiring any attention whatever.



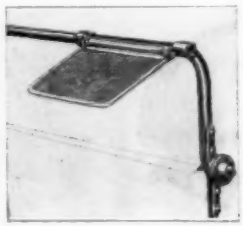

## VAST HARBOR IMPROVEMENTS PLANNED FOR SHANGHAI

A body appointed to make an exhaustive study of the best means of enlarging the harbor facilities of Shanghai, China, has recently reported, recommending that $40,000,000 to $45,000,000 be spent in making the Whangpoo River into a lake, the shores of which will be one continuous line of docks. Emphasis is laid on the fact that China is destined to share increasingly in international commerce after the war. To meet the new demands, there must be harbor facilities sufficient to accommodate the largest boats that will come through the Panama Canal. It is pointed out that if some one port in China does not make adequate provision for the great ships from America and Europe, a Japanese port will undoubtedly be made the terminal for the bulk of the transpacific traffic, and only second-rate vessels would come to China.

In urging the making of the artificial lake and other improvements involved in the change, including the building of quays along some 38 miles of shore, attention is called to Hamburg, Germany, and the expenditures made there to provide a world harbor. It is said that a whole district of the German town, with 1,000 houses inhabited by 24,000 persons, was sacrificed in order that the harbor improvements might be made. It is maintained that Shanghai's advantageous position as compared with other Chinese harbors, and its location at the mouth of the great Yangtse River, make it the logical port for the vast improvements described.

## STORM AND GLARE SCREEN MADE FOR WINDSHIELD OF CAR

Among the late accessories for the motor car, there is a combination storm and glare shield that is designed to be clamped to the outside of the windshield immediately in front of the driver's seat. It forms an awninglike protection of orange-colored celluloid that screens a small part of the shield from rain and sleet in stormy weather, and diffuses the direct rays of the sun, or of the headlights of approaching cars, at other times.



# WOOD WASTE AND GOLD DOLLARS

## Expert Teaches New Ideas in Wood Utilization and Cuts Manufacturers' Wood Bill in Half

By WILLIAM FLEMING FRENCH

OUT here on the west coast, if you mention wood you're almost sure to learn of Sackett. Somehow or other he seems to be correlated with timber, logging, and the like. Even up in the heart of the spruce country, where the government is pulling out millions of dollars' worth of airplane wood a month and where every thought is of war, I ran into an anecdote of this busy woodman.

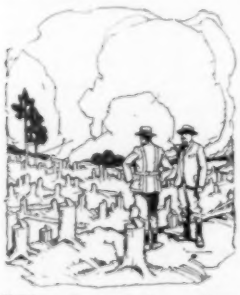
The foreman of a spruce-felling camp told it to me.

"What do I know of Sackett?" he answered. "Well, one thing, anyhow. It was out in the California redwoods, about ten years ago, that I first saw him. He blew into camp one day; an inquisitive snip of a kid with a curiosity lump as big as a puff ball. Back in civilization you wouldn't notice him in a thousand years, but out here in his lumberjack outfit he'd open your eyes for sure. He snooped around our camps for a couple of days and then dropped into headquarters right in the middle of the fireworks. Some simpleton had fouled our booming crane and the whole thing had gone over into the float. Our superintendent was Irish and literally boiled over.

"That didn't faze the mild-mannered Sackett in the least, though. He edged through us to the superintendent, and then let drive at him.

*"Slap! Down went a neat white card. I caught the name Sackett, with about half the alphabet tacked on behind."*

"'Do you know your men are burning hundreds of acres of fine white-oak timber?' he demanded.



*"There he was shown hundreds of thousands of acres of cut-over land . . . covered with pine stumps."*

"'Who'n 'ell er you?' Murphy wasn't feeling like answering damn-fool questions about then.

"Slap! Down went a neat little white card. I caught the name Sackett, with about half the alphabet tacked on behind. And way down in the left-hand corner was something about the U. S. Forest Service.

"Murphy was still sore, but he changed his tune after he drank in that card.

"'We burn all fallen timber and undergrowth preparatory to taking out the redwood. The redwood won't burn, you know.'

"'And how about all the fine white oak that has been felled?'

"Murphy grunted, and gave a snort.

*"He succeeded in getting the mine operators to use fire-killed timber in their mines."*

"'Huh; that's no good. We don't use white oak for anything but its bark. Tan-bark oak, we call it. The bark's all been peeled from that stuff—so those old logs are worthless.'

"Well; that little fellow just laughed, right in the face of our fire-eating boss. Then he came back at him, kind of pityinglike.

"'That's your guess, Mr. Murphy. You people here on the coast are importing white oak from Japan and then telling us it's worthless except for its bark. I've an idea on this subject myself, however, and intend to stop the burning of this wood—if I have to get out an injunction against every logging outfit in the woods.'"

The big foreman grinned reflectively for an instant, then added:

"We quit burning peeled white oak that season. You know the rest of the story."

I did, for Sackett's work is now known throughout the whole country.

Immediately following his investigations regarding the burning of white oak, Sackett started a campaign of education among the lumbermen of the coast, and taught them something of the value of the wood that they had so long despised.

As a result of his work millions of dollars' worth of white oak is now being used on the west coast, especially in California, in the manufacture of furniture and wagons, and for cooperage stock and

the like. As a matter of fact, the value of this wood for such purposes now greatly exceeds the value of the bark that is taken from it.

H. S. Sackett is a wood-utilization expert to whom wood waste is a personal injury, and for years he has fought this great American evil. In fact, he has solved so many problems in waste-wood utilization that he is convinced that there is a use for even the tiniest sliver—and he'll undertake to find that use, too.

So, just before the start of the big war, he was invited down to look over the pine lands of Louisiana, and the South generally. There he was shown hundreds of thousands of acres of cut-over land; land that was covered with pine stumps and considered practically worthless on account of the cost of clearing it.

Here was a chance to demonstrate his ability in utilizing waste wood. Find a use and a market for these stumps and he would have the everlasting gratitude of the South.

That looked like a real job to him, so he buckled in, and within a few weeks was heading a campaign to make turpentine, tar, pine oil, flotation oil, and charcoal from yellow-pine stumps. At Slidell, La., he built a plant and demonstrated to the lumbermen that more money could be made from an acre of pine stumps than they were in the habit of making from an acre of choice timber.

But perhaps this man is best known for his work as Chief of the U. S. Office of Wood Utilization, for as such he developed and prepared the now famous series of studies and reports on "Wood Using Industries of the United States"—the results of which have changed the whole trend of American wood uses. He was also well known as Chief of the Section of Lumber Trade, and later as Chief of Wood Utilization of the Forest Service, in Chicago, when he developed the elaborate Bureau of Information on wood. This work brought him thousands of inquiries from all parts of the world.

Sackett specialized in wood from the instant he entered high school and carried his studies through the universities, attending both Cornell and the University of Michigan, from which he graduated in 1906 with the degrees A. B. and M. S. F. (Master of Science in Forestry), completing a five-years course in four years.

Then began his real studies in wood utilization, and soon he became the pioneer in this field, continually broadening his education with the problems that came to him.

Just out of college, he succeeded in getting the mine operators to use fire-killed timber in their mines, instead of cutting live wood, thereby saving the country millions of dollars by utilizing the abandoned fire-swept forests and at the same time effecting tremendous savings for the mine owners.

From then on he solved one wood-utilization problem after another, and incidentally turned many a scrap pile into a substantial bank account. Apparently no stumper for him could be found, and he proved that the trained wood expert had as sure a place in industry, commerce, and national development as has the metallurgist or the chemist.

He discovered, at the very start, that the average wood user hasn't the slightest idea of correct wood utilization, and next, that about 75 per cent of the practices of the wood users could be accounted for only by precedent.

A few examples of the problems he has solved will best illustrate his method of working, and also drop a hint to the average wood user.

Once he visited a sawmill sawing persimmon lumber and made a few notes in his ever-handy notebook—and then hied off again with a satisfied smile. He returned a few days later and sought an interview with the mill owner.

"Why are your men so carefully sorting out the different-colored woods?" inquired the inquisitive visitor.

"Because we can use the light-colored sapwood for the making of shuttle blocks and golf-head blocks. But the dark, brittle heartwood won't do for this at all, and so we have to sort it out."

"What do you do with the heartwood?"

"Burn it. There is no market for that sort of stuff."

"Are you sure about that?"

"Sure? Why, we've been burning it for 15 years. I tell you there's no market for that sort of stuff. Little blocks of brittle black wood—who wants the likes of that?"

"Try these people," suggested the U. S. wood expert, dropping a card on the desk. "They make parquetry floors. They are up against it for a good, hard, black wood to match up with white maple in their fancy checkerboard floors. You two ought to get together."

They did, and today the parquetry-floor makers have all the black wood they need, while the persimmon sawmill men are able to sell their former waste.

Again, he found a large wood-manufac-

turing plant cutting into strips 6 in. wide, fine full-length oak lumber. These strips were next cut into lengths varying from two to three and a half feet.

"What's that for?" inquired Sackett.

"Ladders," came the laconic reply.

"But why cut up that fine lumber for such small pieces?"

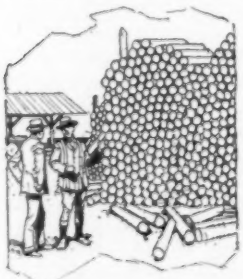
"Doesn't grow any smaller. We got to buy the lumber from the mill and that's the way it comes in."

Out came Sackett's notebook again. Two days later he called the ladder manufacturer on the phone and informed him that a neighboring furniture manufacturer had a world of those strips that he would be glad to sell at a low figure, as he had been using them for crating lumber and for firewood.

"Tradition and habit are responsible for a great deal of misutilization and waste of wood," says Sackett. "If our great-grandfathers used one kind of wood we insist upon using the same, though it has grown expensive and scarce, and even if another kind, which is easily accessible, is really its superior. In the use of iron and steel we always consult the metallurgist, but we go on our own in the selection of wood. And we follow the common practice without investigation or question."

*"Two days later he called the ladder manufacturer and told him that a neighbor had a world of those strips."*

An examination of a plant, manufacturing hickory handles for tools, axes, sledges, hatchets, hammers, etc., disclosed the fact that only the sapwood, or white hickory, was being used, the darker-colored heartwood being discarded as unusable. Questions brought out the fact that it was considered too brittle and weak for tool handles.

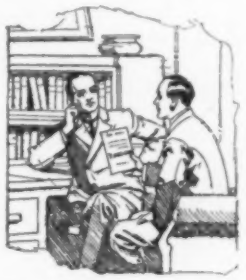


*"'What do you do with them?' inquired Sackett. 'Sell them for firewood.'"*

"Why," asked Sackett of the manager of the plant, "do you say that you can't use the heartwood for this purpose? Have you ever tested the relative strengths of the woods?"

"Certainly not!" came the prompt reply. "I don't have to. There isn't a manufacturer in the country using this stuff, and that's reason enough for us. Besides, the specifications we receive from the big users all prohibit the use of the heartwood. It's too brittle and weak."

That, however, did not convince Sackett, and he made a few tests on his own account. He quickly proved that there was practically no difference in the strength of the two woods, and so started to educate the public accordingly. This took several months, but with the final result that the ban was lifted from the dark, heartwood hickory, and that at present all the tree is used for this purpose instead of only half, as heretofore. This means a straight 50-per-cent saving in raw materials to the manufacturers of hickory goods.



*"Practically any wood-using concern can cut its wood bill in half."*

A few months later he was called upon to find a market for the dark or heartwood that was being scrapped by the manufacturers of birch spools. These manufacturers of thread and ribbon spools were compelled to make their product from the white birch, or sapwood—owing to tradition. The market simply would not buy dark-colored spools, and the manufacturers were in a quandary as to what could be done with the other half of the wood they purchased.

It happened that Sackett had recently had a rather strenuous session with the owner of a plant that turned the dark-colored birch into imitation-mahogany hairbrush backs, and other toilet articles. This individual was burning his light wood, stoutly maintaining that it was simply folly to attempt to find a market for the small and odd-shaped waste from his workshop.

By bringing these two woodworkers together, Sackett accomplished a triple saving: first, the dark wood that was being burned; second, the light wood that was being burned, and third, half the cost of raw materials to each manufacturer.

On another occasion he found an interesting problem in a rotary veneer plant. There he saw machines peeling endless sheets of veneer from four-foot logs of

various "precious" hard woods—mahogany, etc. These veneer sheets varied from 1/16 to 1/4 inch in thickness, and consequently were of necessity taken from only the soundest wood. Because the center or heart of the hard woods is generally defective or rotten, the process of peeling is stopped about five or six inches from the heart of the wood. As a result this plant had an enormous pile of hardwood cores in its yard.

"What do you do with them?" inquired Sackett.

"Sell them to our employes for firewood, or to anybody that wants to use them for crating. Lots of them we burn. There is no market for them, though."

But Sackett already had the answer to this. Not long before, a large coal-mine operator had appealed to him to help solve their mine-roller problem. These mine rollers are placed in the mines for the cables to roll back on and were made from small, lathe-turned trees, the supply of which was rapidly being exhausted. Besides, it had seemed a shame to the mine operator to have thousands of straight young trees cut down for this purpose every year.

"I'll tell you what—just get in touch with this mining company," scribbling the name and address on the back of the envelope, "and offer them your hardwood cores, after you have bored an inch hole through their centers."

This was done, with the result that the veneer manufacturer is receiving a substantial income from his scrap cores, while the mine operator is buying a better grade of mine roller at less than half the former cost, and thousands of young trees are saved each year.

A hundred such examples of how Sackett solves wood-utilization and scrap-saving problems could be cited, but the foregoing are sufficient to illustrate his general method of procedure.

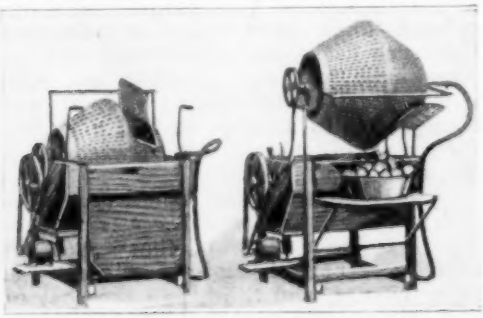
This wood-utilization expert's claim is that by proper methods practically any wood-using concern in the country can cut its wood bill in half, and as a proof of this he saved for the Chicago, Milwaukee, and St. Paul Railway Company a half million dollars on a single year's wood bill. This was accomplished by the use of a score of different methods of scrap utilization and by the proper selection of wood, based upon the specific requirements of each class of work.

Here is a man who has proved absolutely that anyone willing to specialize and dig to the very bottom of any subject can blaze a new trail for industry—for Sackett's methods of wood saving and wood utilization have introduced a new science to the work-a-day world. He is a pioneer in his line and is recognized as such in every wood-using community in America, and in foreign countries as well.

He has been appointed chairman of the Committee of Reclamation for the Milwaukee road, under the order of the United States Railway Administration, and he is not yet 35 years of age.

## MOTOR-DRIVEN POTATO PEELER FOR CAMPS AND HOTELS

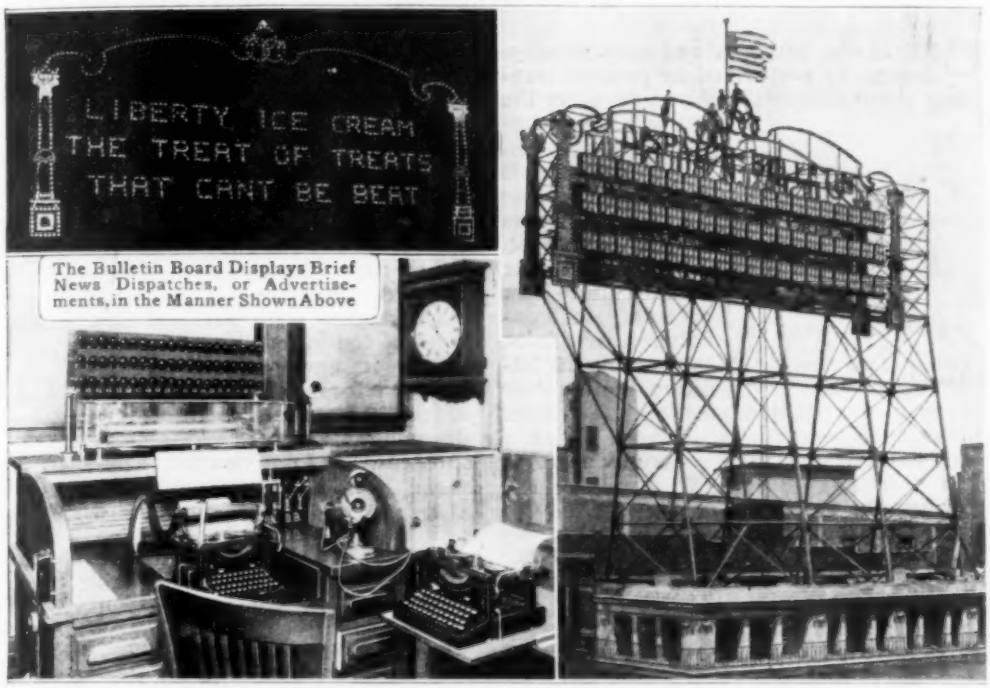
A machine which will peel 40 lb. of potatoes in three or four minutes has been invented for hotels, army camps, etc., the peeling being done by a revolving drum driven by a 1/3-hp. motor. The inner surface of the drum has been roughened by making numerous perforations in the metal. When filled it is lowered into a wooden container and set to running, while a stream of water from a hose, inserted at one end, washes off the particles of skin that are loosened by contact with the drum.



Left, Motor-Driven Potato Peeler with Drum Lowered: The Hose at the Right Injects Water into the Drum as the Potatoes are Tossed About. Right, the Drum Raised and Emptied of Potatoes: Current for Driving the Motor can be Obtained from Any Light Socket

## COFFEE IN SOLUBLE STICKS FOR MEN AT FRONT

The government has taken over the country's supply of soluble coffee for the benefit of the soldiers. The coffee is of good quality and is being put up in stick form, like chewing gum, with waterproof wrappers. If for military reasons it is undesirable to light fires in or near the


LIBERTY ICE CREAM
THE TREAT OF TREATS
THAT CANT BE BEAT
The Bulletin Board Displays Brief News Dispatches, or Advertisements, in the Manner Shown Above

**At the Left Is a View of the Operator's Room, Showing the Typewriter Controller, and above It the Pilot Board. At the Right is Pictured the Display Frame Installed atop the Newspaper Building**

trenches, these sticks can be dissolved in cold water, making a beverage that is quite acceptable in the emergency. New companies have been organized to help supply the growing demand for this product.

## ELECTRIC BULLETIN BOARD TYPEWRITER-CONTROLLED

News dispatches and advertising matter are luminously displayed at night on a large double-faced electric bulletin board that is operated by a local paper in one of the mid-western cities. The board is installed atop the newspaper building, where it may be plainly seen by the street crowds. It is equipped with typewriter control, and therefore in method of operation reminds one to a degree of certain printing-telegraphy systems. The display frame is supplied with three rows of 20 squares each, fitted on opposite sides with incandescent bulbs so grouped and wired that any letter or numeral may be formed. The keys of a modified typewriter, included in the circuit, form the necessary contacts, when struck, to outline in the successive squares the various characters they represent. Thus, to flash a bulletin, the operator has only to write it on the typewriter controller, making at the same time a typewritten record on paper. A pilot board before him, arranged with 60 green lamps corresponding to the several squares in the display frame, informs him whether or not the various characters are being illuminated as he writes them. The capacity of each side of the board, obviously, is 60 letters and spaces. A bulletin may be flashed in about 10 seconds. It will remain illuminated until a "kill" key is struck, extinguishing it.

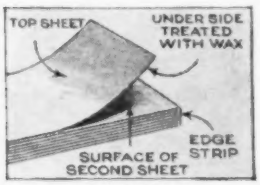
## EFFICIENT MAIL SERVICE FOR MEN AT FRONT

The mail service of our soldiers abroad, formerly in charge of the civil authorities, has been taken over by the army, which is now handling with dispatch the 1,000,000 or more letters per day which are received in France from this country, as well as 300,000 letters per day mailed in France for American soldiers in that country. In addition to a big central post office and permanent post offices at various points, there are large warehouses at French ports for sorting the mail, and mobile post offices that move right up to the firing line. Each company has orderlies taking care of the mail for their respective units.

# HOW MEDIUMS FAKE MESSAGES FROM THE DEAD

By HARRY E. GIFFORD

ONE of the common and very mystifying tricks performed by persons traveling about as spirit mediums involves the use of a memorandum pad on which the sitter is requested to write the names of several, usually three, departed dear ones from whom a message of consolation or advice is desired. In addition, the inquirer is asked to write one question, the answer to which is wanted particularly. With a little practice one can successfully perform this trick by following the procedure described below.




The Pad with Which the Trick is Done: The Under Surface of the First Sheet Has a Thin Coating of Wax

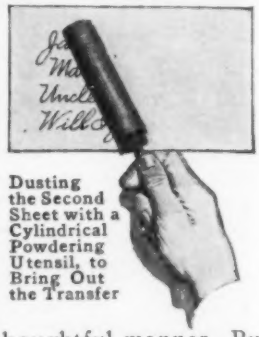
The medium places the sitter at the opposite side of a table or desk to himself and offers him a pencil and pad of paper on which the data mentioned above are to be written. Apparently there is nothing unusual about the pad. Nevertheless it is one which has been especially prepared in advance, the underside of the top sheet and of one or more alternate sheets below having been given a coating of white wax. Preferably this is done before the sheets are assembled and glued into a pad.

While Feigning Communication with the Spirits Regarding the Folded Note Held against His Head, the Medium is Dusting the Waxed Sheet So That He can Read the Inscription

The sitter writes the names of three friends and the important question, as requested. In so doing wax on the underside of the top sheet is transferred to the second sheet through the pressure of the pencil. The sitter is then directed to tear off the top sheet, without allowing the medium to look at the writing, and fold it into a small pellet. This done, the pad is casually picked up by the medium and placed on a projecting drawer or shelf, out of sight of the sitter but in full view of the medium.

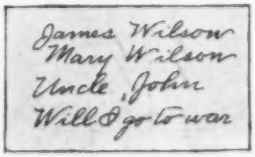
The Sitter Writes the Required Data on the Pad with an Ordinary Pencil

The medium then takes the pellet of paper from the sitter and, always keeping it in view of the latter, places it against his own forehead, at the same time dropping his gaze and scowling in a thoughtful manner. By placing one elbow on the desk and resting his head in his hand the medium is able to obtain a full view of the pad. While pondering in this posture, the medium with his free hand takes a long, cylindrical powdering utensil from a convenient place. This article is covered with black powder and he deftly passes it over the top of the pad. The black powder will adhere to the wax, revealing the names and question.



Dusting the Second Sheet with a Cylindrical Powdering Utensil, to Bring Out the Transfer

Having thus secured the information written on the folded pellet, he hands the latter back to the sitter and pretends that through his power as a clairvoyant he has read the names and the question and recites the contents of the folded sheet as proof of his claim. The medium then engages the sitter in conversation, drawing him out in ways which will enable the trickster to frame a "message" from one of the departed friends which will appear plausible and



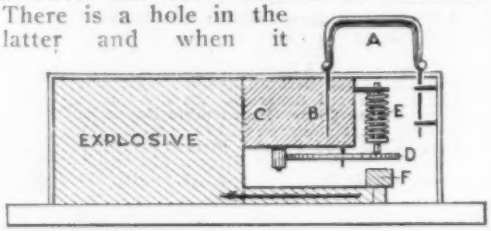

The Result of Passing the Dusted Roller, Shown in the View Above, across the Page Containing the Transfer

give satisfaction. With a little experience one can thoroughly astonish those who act as sitters. It is easy to understand why credulous people on leaving a clever medium will tell their friends how the clairvoyant "read names from a folded sheet which had not been out of sight or opened."

Should the first attempt at having the sitter write on the pad result in an indistinct transfer to the second sheet, complaint can be made that "the spirit conditions were not perfect" or that "the sitter was not in harmony with the occasion." In the meantime the waxed sheet is deftly torn from the pad and the latter handed to the sitter for a second attempt.

## TIME BOMBS MAKE GERMAN PLANES SELF-DESTRUCTIVE

To enable airmen to destroy their machines after making forced landings within the allied lines, nearly all German biplanes for more than a year past have been equipped with time bombs. One of these is installed near an aeroplane's fuel tank. It consists essentially of a detonating mechanism controlled by clockwork and incorporated in a rectangular casting that holds a chamber filled with explosive. A handle at the top of the device, when raised, starts the clockwork, which drives a wheel one revolution in 10 minutes. There is a hole in the latter and when it




BY COURTESY OF LA NATURE, PARIS

Showing Arrangement of Aeroplane-Destroying Bomb Adopted by Hun to Prevent Capture of Planes Forced to Land within Allied Lines: A, Handle; B, Fin That Sets Clockwork in Motion; C, Clockwork; D, Slotted Wheel; E, Firing Plunger; F, Detonating Charge

reaches a certain position, a spring plunger forces through it, striking a detonating cap that sets off the explosive.

## NEW TYPE LIGHTNING ARRESTER IS SELF-MENDING

Of interest and possible importance in the electrical world is a new type of lightning arrester that has recently been developed. It consists of a series of cells, one of which is comprised of two sheet-metal electrodes covered with a thin film of insulating varnish. They are placed about a half inch apart and the space between

BY COURTESY OF THE ELECTRICAL REVIEW, LONDON

One of the Arrester Cells, With a Linear Rule at Its Side, is Shown Above at the Left. Its Parts, Disassembled, are Pictured at the Top. Beneath Them are Shown an Unused Electrode and, at Its Right, One through Which Several Thousand Discharges have Passed. The Spots Visible on the Latter Are Insulating Litharge Plugs

them is filled with a conducting powder, lead peroxide, which upon the application of heat is converted into nonconducting litharge. In the event of the voltage rising above normal, the film is punctured in miscroscopic points. Meeting with practically no resistance, the lightning charge grounds. The intensity of the ordinary current then becomes great in the vicinity of the punctured points, resulting in localized heating that changes the conducting lead peroxide in these minute paths of current flow to insulating litharge. Thus the punctured film is resealed. The important phase is that this reinsulating action is accomplished so quickly that an oscillograph of 2,000 cycles per second fails to register its duration.

## TONS OF PURE LEMON DROPS MADE MONTHLY FOR ARMY

Having found that the favorite candy of a majority of our soldiers is lemon drops, and that most of those on the market were made of glucose with artificial flavoring, the War Department undertook to remedy the situation. It obtained the formula for a make of lemon drops which chemical examination showed to be the purest, and now has candy factories turning them out at the rate of 200,000 lb. per month for the soldiers.

¶Because the acetic acid which formerly went into Paris green for garden use, etc., is being used in waterproofing the cloth of aeroplane wings, new sources of this acid had to be found. Fortunately Paris-green manufacturers are now able to secure adequate quantities from vinegar supplied them by yeast manufacturers.

# HOW WAR HAS TOUCHED LIVES OF CHILDREN,

If the Supply of American Shipbuilders in These Days has Not been Equal to the Demand, There Is Promise That the Next Generation will be Better Off, for Little Folks, as the Picture at the Left Shows, Already are Learning to Construct Hulls That Have Keels, Ribs, and Decks. To These Frameworks Suitable "Armor Plate" is Fastened

PHOTOS COPYRIGHT, PRESS ILLUSTRATING SERVICE

At the Right They Are Ready for the Launching. This Is Indeed a Busy Shipyard, with One Vessel About to Slip Down the Little Ways and Others in Various Stages of Construction. Tools have been Dropped among the Pieces of Lumber, a Flag has been Fastened to the Bow, and the Little Chap in the Background Is All Ready to Let Go His Cap, Which will be the Signal for Launching

A Reminder of How Children have Suffered in the Great War: Here Are 160 Homeless Boys and Girls Crossing a Drawbridge into a Great French Chateau, or Castle, Which was Built Long before Days When Columbus Discovered America. In the Castle Grounds Are Quite Comfortable Barracks Where These Children will Live under the Care of the Red Cross. Fifteen of Them are Called "Stars and Stripes Children" Because American Soldiers are Paying for Their Care

COURTESY OF THE AMERICAN RED CROSS

# AND VARIED SCENES OF INTEREST TO THEM

Here Are Five Little French Boys Enjoying Kindergarten Work Out of Doors. They and Nearly 60 Others are Cared For by French Sisters and the American Red Cross at a Place Not Far from the Castle Shown on the Opposite Page. The Bench was Made by Older Boys Who have been Taught Carpenter Work

COURTESY OF AMERICAN RED CROSS

This Baby Squirrel Is Only Two Weeks Old, But He has Learned to Nestle in the Warm Hand of His Protector and to Take His Dinner from a Doll's Wee Nursing Bottle, having been Cared For in This Way Since He Was Six Days Old

This Group of Cincinnati Schoolgirls have Shown Their Patriotism by Knitting This Handsome Hospital Blanket, in the Center of Which Is a Big Red Cross. The Stars and Stripes Above and the Initials at the Left of the Cross will Tell Their Own Story to Every User

A Real Clubhouse for Boys 60 Feet above the Ground, in a Great Oak Tree in New Haven, Connecticut: It Measures 12 Feet Square and Has a Two-Foot Porch Running All around It. Before the War the House was Equipped with a Wireless Outfit

## SPECIAL RADIATOR SECTION A HUMIDIFIER

To overcome the unhealthful dryness of the air in steam-heated rooms, a special section is being manufactured for incorporation into steam radiators. Outwardly it resembles other sections, but in reality it is a water container with a hinged top, for convenience in filling. A slot in the top permits the moisture to escape into the room, while steam from adjoining sections passes through its hub only. An automatic valve, which is intended to keep the steam in circulation and make an air valve unnecessary, can be installed in this section if desired. This valve is provided with a condensing coil to which live steam is constantly drawn from various parts of the radiator. By this means the section is supplied with water for evaporation.

## BAD WEATHER HAS NO TERROR FOR THE YANKEE NURSE

For rainy-weather wear in France, the American nurse is supplied with waterproof togs such as are worn by the young woman pictured in the accompanying illustration. Warmly dressed in this weatherproof apparel, she is protected against cold and dampness wherever duty sends her.

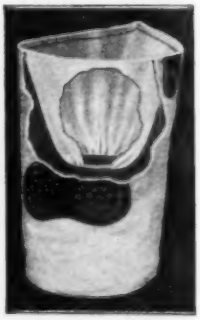
¶Splendid evidence of patriotic spirit, with a lesson which is obvious to every civilian, is found in the fact that the men at the Great Lakes Naval Training Station, out of their pay of $32.50 per month, subscribed for $2,500,000 worth of bonds of the fourth Liberty loan.

## BRITISH SAVE LUMBER BY REUSING BOXES

Substantial gifts to the British Red Cross, and a correspondingly large saving of lumber, have resulted from the request of a British firm dealing in foodstuffs that retailers promptly return the cases in which they receive their goods. It was agreed that whatever saving resulted from using the old packing boxes would be turned over to the Red Cross in the name of the grocers. The first contribution was made at the end of three months and amounted to $4,700.

## FEED-BAG SHIELD PREVENTS LOSS OF GRAIN

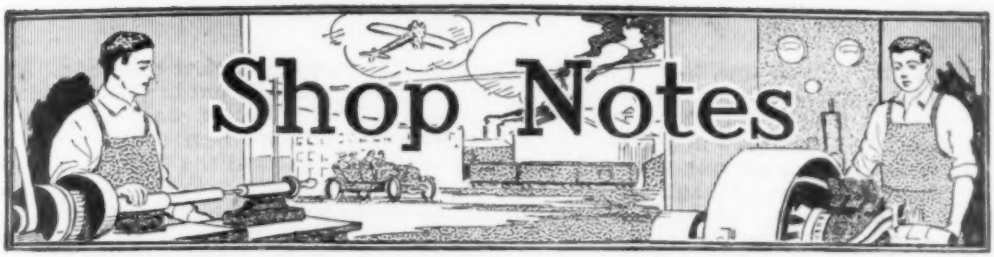
A shield has been designed for horses' feed bags which prevents all spilling of grain while an animal is eating—a loss which sometimes amounts to 25 per cent. The device consists of a funnel-shaped apron of cloth, with a sufficiently large opening at the bottom, which fits inside the bag, being attached to the upper edge and extending about halfway down into the container. The lower end is gathered by means of a coiled spring and fits snugly about the horse's nose so that no matter how much the animal tosses its head, no grain is lost.



## KINDS OF FIBER IN ROPE DETECTED BY NEW TEST

The Bureau of Standards has adopted a method of testing Manila rope, the essential features of which include freeing the fiber of oil and soaking it for a brief period in a bleaching solution, to which acetic acid has been added. Following this, the rope is rinsed in water and then in alcohol, after which the fibers are exposed to ammonia fumes. This turns Manila fibers russet-brown, while others turn cherry-red.

¶Distribution in Germany of French, English, and American newspapers containing accounts of allied successes, has been "verboten."

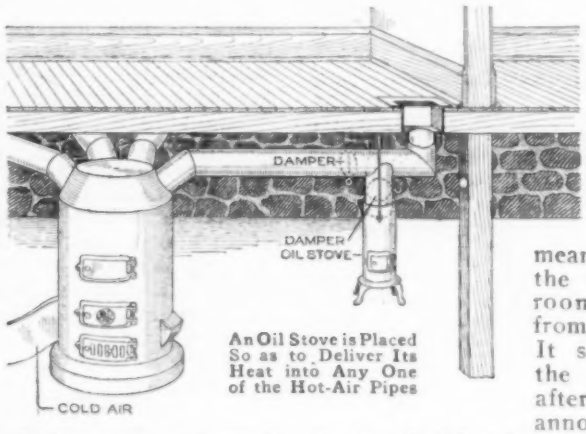



In conformity with the wishes of the Fuel Administration that all possible means of saving fuel be employed this winter, we are presenting in this issue a number of articles giving the methods used by some of our readers. It is hoped that they will be of assistance as regards this vital factor in "winning the war."—Editor.

## Auxiliary Oil Burners in a Hot-Air Furnace

By H. E. GIFFORD

MY furnace heated four rooms on the first floor and five rooms on the second floor. Coal was scarce, and had to be obtained in 100-lb. lots, on the go-get-it plan, and drawn on a sled. When the furnace was banked, or kept low, it was impossible to heat all the house. One room on the second floor was rented to a couple, and the wife did not leave her room until noon. It must be without chill from eight o'clock in the morning until then; in the evening the room must be comfortable from 6:30 to 9:30. To place an oil stove in this room meant the burning of unnecessary oil by the occupant of the room, and much running up and downstairs with oil or oil stove; so a plan was contrived to take the chill from the room without building a large furnace fire, or going to the second floor. The same plan remedied the difficulty experienced in heating the parlor on the first floor when the wind was blowing in such a way as to produce this trouble.




An Oil Stove is Placed So as to Deliver Its Heat into Any One of the Hot-Air Pipes

A drop pipe was added to each service pipe of the furnace, with attachments for hooking the oil stove in the bottom of the vertical pipe. A damper was placed in the upper end of this pipe section, to be closed when the oil stove was not burning. In the morning, at the required time, we went to the basement, and, turning the damper, lighted the stove; with the damper in the supply pipe from the furnace closed, the heat from the oil stove heated the room occupied by the couple in a short time. The stove was extinguished at the proper time, and the same plan was followed in the afternoon, and for the parlor when occasion required.

With a low or banked furnace fire, there is very little auxiliary heat required. There is thus an advantage, even in very cold weather, in having a means of regulating the heat of each room, separately, from the basement. It saves running to the rooms to look after the stove and annoying the occupants. Besides, it is much nicer to have the heater removed from sight, instead of in the room where one is sitting.

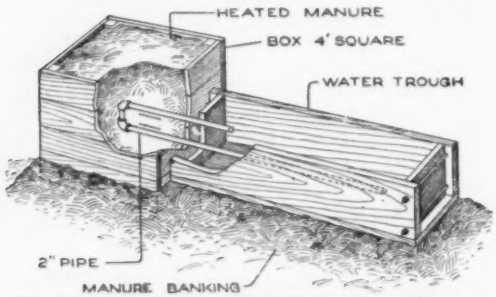
However, the seasons when no fire is kept in the furnace are the best times to feel the great advantage of this plan. One can take the chill from a room at any time, just as though the furnace were working. One may warm any single room, or several, one after another, with the same oil stove; if two or more must be heated at the same time, the same number of oil stoves will be required. Even where there are a number of such rooms, several stoves in the basement will be found more economical than burning coal, as they can be turned off any time.

Where gas is available, especially natu-

ral gas, it is, of course, more convenient to place permanent downward pipes in every hot-air pipe, and have a gas burner in each like those used in gas stoves. If gas is not obtainable, one may still have a permanent oil burner, such as are used in some oil stoves, but the style used by the writer was the ordinary small oil stove, with a handle to carry it around.

### Keeping a Water Trough from Freezing

The arrangement illustrated will be found to have considerable effect in keeping from freezing the water in a trough on the farm. The part of the pipe which is covered with manure is heated, and the water flows upward, cold water being then drawn in through the lower pipe. The effect will, of course, be much greater if a coil of pipe is imbedded in the manure. It should be placed rather above the center of the manure box, in order to have the greatest heating effect.—R. M. Magnus, International Falls, Minn.




**The Water in the Trough is Heated by a Pipe or Coil Imbedded in a Box of Manure, and is Thus Kept from Freezing**

### Saving Fuel in the Plant Which Burns Oil

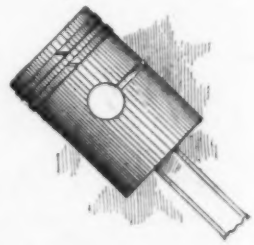
The oil-burning steam-heating plant of which I have charge was supposed to be running as economically as was possible in practice. However, when the price of fuel oil began to go up, I saw that it was up to me to do better. Knowing that there was no big waste anywhere, it was obvious that if any saving was to be effected, it must be in little things. Consequently, beginning at the fires, I relined and refloored the furnaces, or fire boxes, under each boiler with fire brick, taking great care to give just the proper amount of air vents in each floor. The water and oil pumps were then thoroughly overhauled; quite a saving was made here, as the pumps could run more slowly when they were in perfect condition. All steam traps were also put in good working order. A coil of pipe was put in the smokestack, to superheat the feed water just before it entered the boilers. I also had the boilers cleaned each week, instead of every two weeks, as formerly.

The big saving, however, was made in the management of the fire itself. In burning fuel oil, it is necessary to have the mixture of steam, oil, and air exactly right to get perfect combustion. If too much oil is admitted, it not only wastes oil at that time, but it also deposits soot in the boiler tubes, so that even with a perfect fire, after the soot has been deposited, there is a great loss of heat until the tubes are cleaned. The plan by which a nearly perfect fire was secured is this: Each evening, when the fires are put out for the night, I personally inspect each boiler, and whenever soot is found in the tubes I have the fireman brush them. As everyone dislikes this job, it being so hot, dirty, and disagreeable, the firemen soon got to watching the fires much more closely, and, seeing the benefits in personal comfort derived from clean fires, they have now entered into the spirit of the thing, and vie with each other in getting as perfect combustion as possible.

Summing up, as we have reliable data showing our evaporation of water, I can state positively that our saving is at least 4½ per cent, and am quite sure that similar attention to minor things will effect a considerable saving in all steam plants. While apparently the percentage is small, the actual amount of fuel saved is quite large.—M. L. Lowrey, Livermore, Calif.

### Lubricating Piston Pins on V-Type Engines

In the modern V-type high-speed engines, where the cylinders are very small, the proper lubrication of the piston pin is a difficult matter and has given considerable trouble, especially with aluminum pistons. Because the cylinders are placed at an angle, the oil is drained to the lower side, and the pin bearing receives less oil than in the vertical types. The bearings are also small, due to the

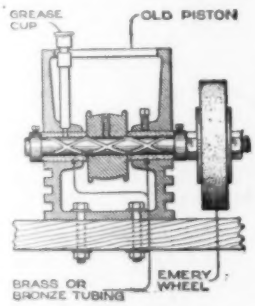


small cylinders, which tends to increase the difficulty of proper lubrication.

This trouble has been overcome, in one of the famous foreign aeroplane engines, in a very simple manner. The same method has since been used on several automobile engines with entire success. A groove is cut from bearing to bearing on the top side of the piston, as shown in the illustration. The oil collects in the groove, and drains into the piston-pin bearings. The depth of the groove in the piston depends upon the thickness of the piston at that point, and care must be taken that the wall is not weakened too much.—S. E. Gibbs, Urbana, Ill.

### Bench Grinder or Polishing Head Made from Old Piston

A badly worn piston from an old gas or automobile engine can easily be made into a bench grinder or polisher. The piston-pin bearings are best fitted with a brass or bronze bushing, or a bearing can be poured with babbitt around the shaft. The belt pulley, being placed inside the piston, is surrounded by the piston wall, forming a splendid belt guard. The grease cup, mounted as shown, furnishes lubrication, and the oil or grease should be distributed by means of grooves cut in the shaft. Emery or polishing wheels may be mounted on one or both ends of the shaft, which is held in place by collars with set-screws. The piston may be bolted either to the bench, or to a special stand made for it. The stand should, however, be very stiff to withstand the high speeds at which these tools are run.

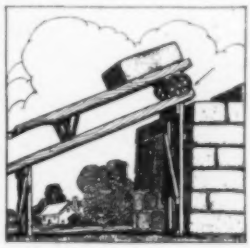



### Keep the Coal Wet

One way of saving coal, which is widely known but not so widely practiced, is by keeping it wet. It is found by tests, that coal which is kept exposed to the air, loses a considerable percentage of its fuel value by gradual oxidation. This can be eliminated by keeping the coal under water, or it can be reduced very largely by keeping the coal wet.—John J. Spaulding, Zanesville, Ohio.

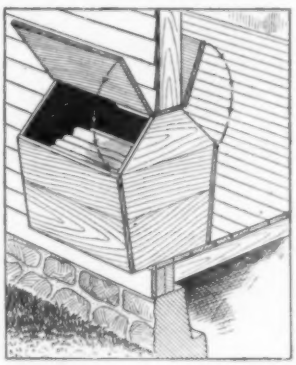
### Moving Heavy Stones into Place on a Wall

In moving heavy stones to the top of a wall, a low truck or barrow was used on a broad plank, which formed an incline and had at its upper end a groove, in which the upper wheels could rest. The truck, carrying a heavy stone, was pushed up the plank, until the wheels fell into the groove; the handles could then be lifted so as to slide the stone off onto the wall, without danger of sliding back down the incline, and without the necessity of placing any blocks back of the truck wheels. As the placing of such blocks would require the labor of an extra man or boy, considerable expense was saved by this arrangement.—J. G. Allshouse, Vandergrift, Pa.



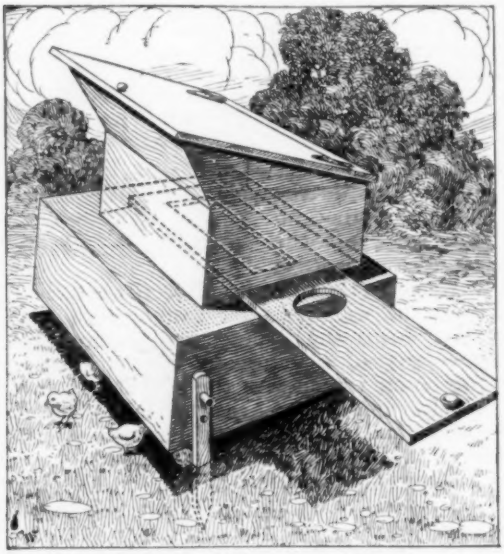
### Wood Box Built into Wall of Kitchen

Carrying wood into the kitchen for use in the range is one of the chores which nearly every farmer's boy dislikes. It is troublesome because doors must be opened and closed while the arms are full, and because it is difficult to keep the wood from striking against objects in the kitchen. A better and cleaner way is shown in the sketch. The wood box is built into the wall; the wood is thrown in from the outside, and can be lifted out by opening another door on the inside. The outer door should be fitted quite closely, and may be packed with felt, or several thicknesses of cloth, in order to keep out the cold air. The "dead air" in the wood box will then form a good heat insulator.—P. T. Hines, Raleigh, N. C.



### Poultry Feeder Places Food for Chicks Out of Hens' Reach

The chicken feeder here shown is designed to place the proper amount of grain within reach of the young chicks,



**The Edge of the Box Is Just High Enough to Give Access for the Small Chicks, While Excluding the Hen. Shifting the Board Drops a Supply of Grain to the Ground**

but out of reach of the hens. A box, in the bottom of which a slot, several inches wide, has been made, is inverted and fastened to stakes driven in the ground, so that one edge stands just high enough to permit the chicks to pass underneath. The bin placed on top is made from another box, and may have one edge flared out as shown, so that the grain can be dumped in with less danger of spilling. The slot in the roof of the lower box is covered by a board twice as long as the box, with a round hole at its center. This board slides back and forth endways, the ends of the bin being cut out to fit it. Each time it is shifted over, some grain is permitted to fall through onto the ground. This amount can be adjusted after some experience by changing the speed at which the board is shifted.

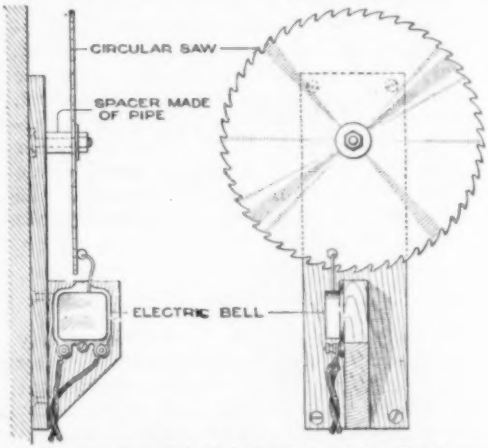
The bin is provided with a hinged cover, so that all grain except that which has been dropped on the ground is protected from the weather. At night, or in rainy weather, if the pegs are removed from the stakes and the box dropped to the ground, the grain remaining will be protected from getting wet or from the ravages of small prowlers.—F. W. Vroom, East Lynn, Mass.

### Thermometers Save Coal in Small Plant

In a small manufacturing plant it was the night watchman's duty to fire the boiler and keep the place heated; in order to be sure not to have any freeze-ups, he kept up more steam than was actually needed. To overcome this we placed a thermometer at each station where the watchman had to stop when making his rounds, so that he could see the actual temperatures, and keep the various departments properly heated without waste. This eliminated guesswork, and as he did not have to fire his boiler so often, he saved time, labor, and an amount of coal that paid, many times over, the cost of the thermometers. In many small plants, the only places where a thermometer can be found are the boiler and engine room, and possibly the office. In the home also, a small investment in thermometers will pay good dividends in coal saved.—M. Bush, Bloomfield, N. J.

### Discarded Circular Saw Forms Loud Bell for Use in Shop

A shop, which needed a loud bell for signaling, and possessed some old worn-out circular saws, made use of the combination of circumstances by rigging up the bell illustrated. A rather powerful electric bell furnished the tapper and the magnet, while one of the saws was mounted on a bolt through the center hole, to be struck by the tapper. The result




**A Circular Saw Which had Outlived Its Usefulness as a Cutting Tool was Made to Do Service as a Powerful Noise Maker by Combining It with the Mechanism of an Electric Bell**

was a sound which could be heard above the noise of the shop machinery.

# Automobile-Exhaust Heater Mounted in Floor Register

By C. C. SPREEN

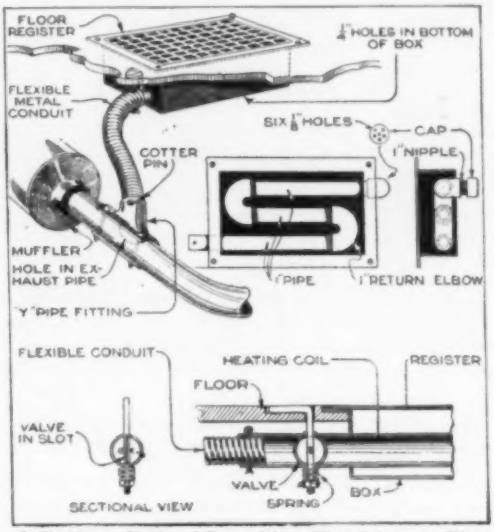
HEATERS for automobiles are made in various ways, most of them utilizing the heat of the exhaust, since this heat is otherwise wasted, and can readily be piped to some form of radiator. Notwithstanding the apparent simplicity of such systems, the manufactured ones are often fairly expensive, and their installation is none too simple.

On most cars it is possible to cut a rectangular hole in the floor boards and install a small register, such as is used with hot-air furnaces. A radiator can be built into the register, as illustrated. The exhaust end of the radiator is plugged with a nipple and pipe cap, a number of small holes being drilled in the cap to enable the gas to escape after having done its work. At the intake end of the radiator, some form of low-pressure valve should be placed. In the one illustrated, a ⅜-in. steel rod is bent to form a lever at the upper end, the lower end projecting through the pipe and carrying a nut and a spring to keep the proper tension. The valve consists of two thin steel disks with an asbestos disk between them, and is fastened with a cotter pin in a slot sawed in the ⅜-in. rod. The asbestos disk is slightly larger than the steel disk. While such a valve, of course, is not able to withstand any considerable pressure, it will close the pipe nicely in an installation such as this one.

A cotter pin is placed through the rod, just above the pipe, to take the thrust of the spring and hold the valve in proper position. The bent upper end of the rod may be sunk into the floor, where it will be out of the way but easily turned by a touch of the driver's heel.

The exhaust gas is taken from the main exhaust pipe through a flexible metal conduit, one end of which is fastened into the radiator pipe with a cotter pin, and the other similarly fastened into a lateral, or "Y," pipe fitting. This fitting may be bolted around the exhaust pipe, one side of it being cut out so that it can be slipped over the pipe, in case the exhaust pipe is so arranged that the fitting cannot be readily slipped over its end. A hole is made in one side of the exhaust pipe where the "Y" is to come.

The heating efficiency will undoubtedly be higher if the exhaust pipe is tapped between the engine and the muffler; this may, however, involve some possibility of a noisy exhaust through the radiator. Installing the Y-fitting beyond the muffler has the additional advantage that less dirt will enter the radiator, and that the possibility of its becoming overheated

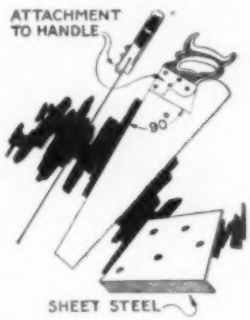



**A Radiator Built of Iron Pipe, Fitted into a Floor Register and Heated by the Exhaust from the Engine, Overcomes Largely the Discomforts of Winter Automobile Driving**

from badly timed engine valves is almost eliminated.

## Handsaw Fitted with Attachment for Use as Square

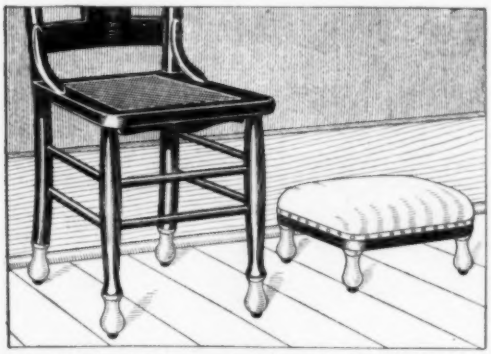
A small fitting for a handsaw, that will not affect its use for ordinary purposes, but will add to the general utility of the tool, especially for quick, or rough work, is a square fitted to the handle. The attachment is made of sheet steel, shaped as shown, and drilled for fastening to the wooden handle. The adjustment should be made very carefully to 90°, to insure that the square will be useful for the purpose intended. The practical features of this kink will be readily appreciated by mechanics.




¶ Pulverized asbestos and plaster of Paris in equal parts by weight, and water sufficient to make a soft paste, make an effective asbestos cement.

### Base Knobs or Door Bumpers Put to Various Uses

Base knobs, which may be purchased for from 2 to 10 cents each, may be used for many purposes besides acting as door

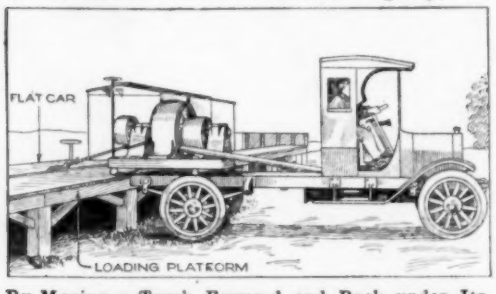


Base Knobs, Such as are Placed behind Doors to Keep Them from Marring Woodwork, Are Useful for Purposes Such as These

stops. An ordinary chair may be made higher for a child's use by simply screwing a knob into the leg of each chair. A novel footrest may be made from the top of a discarded organ stool by screwing four of these knobs into the underside. Small tables may also be made higher by this means.—Mrs. Grace E. Willey, Concord, N. H.

### Unloading a Heavy Machine from a Truck

A man who had the job of unloading heavy machines from a truck was confronted by the shortage of labor, and employed a method which made use of the power of the truck for moving machines. On backing the truck up against the loading platform, the machine was moved by means of levers, so that the base of it projected about 10 in. from the rear end of the truck. It was raised slightly, so

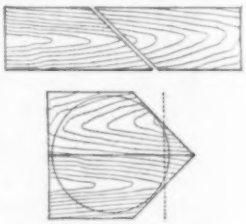



By Moving a Truck Forward and Back under Its Own Power, Heavy Machines are Unloaded from It on Rollers, and Pushed onto Flat Cars

that a roller could be placed under it. While a rope and hook then held the machine from moving, the truck was moved forward a short distance, under its own power. It was then gently backed against the platform again, the machine thus moving farther onto the platform, and enabling more rollers to be placed under it. With the rope shortened, the operation was repeated, until the machine rested entirely on rollers on the platform. By means of a pole, the machine was then pushed, a short distance at a time, onto the flat car beyond the loading platform. The process should be attempted only by a truck driver who is thoroughly familiar with the clutch action of his truck, as too great a movement of the truck might easily prove disastrous to the load.

### Lumber-Saving Kink for Making Split Patterns

To make a circular, split pattern, it was necessary to cut two semicircular pieces of wood. A piece of material was found which was suitable, except that it was not quite twice as long as the diameter of the circle. The diagram shows how this stick was nevertheless used, by sawing it at an angle. The dotted line shows how much too short the stick would have been if it had been cut at right angles.—C. W. Thunen, Benicia, Calif.



### Extinguishing Spontaneous Fire in a Coal Pile

A large pile of coal was found to be on fire, due to spontaneous combustion. A hose and water pressure were available, but it was found difficult to make the water penetrate deeply into the burning coal. The difficulty was overcome by attaching to the end of the hose a 10-ft. length of 1-in. iron pipe. The other end of the pipe was thrust into the pile as far as possible, and the water turned on. As the coal directly in front of the pipe was gradually forced away by the water pressure, the pipe was thrust farther in. Occasionally a large lump was encountered, which would have to be broken by blows of the pipe itself acting as a hammer, or of a heavy hammer applied to it. After driving several holes into the interior of

the coal pile in this way, the fire was found to be extinguished.—Maury Robinson, Paris, Tex.

### Sheet-Metal Backing Helps When Sawing Softer Materials

When attempting to cut a very brittle piece of hard rubber, fiber, or asbestos sheeting with a hacksaw, especially if only a small vise is available for holding the work, it is well to clamp the material between two sheets of tin or other thin material. The resulting cut will be true, smooth, and firm-edged. This is particularly helpful in the case of cutting materials such as asbestos.

### Dissolving Boiler Scale Saves Fuel and Provides More Heat

One means of saving coal, which is applicable to any hot-water heater or steam boiler where hard water is used, is that of keeping the boiler clear of scale so that the heat can reach the water, instead of being wasted to a large extent in the chimney gases. When starting a fire, if a small can of potash, dissolved in about a gallon of water, is poured into the boiler, it will help greatly to loosen the scale as the fire starts to burn. After the system has become thoroughly heated up, the fire should be allowed to die out and the boiler to cool down. The water is then drawn off, carrying with it the scale which has been removed, and the boiler is filled with fresh water and is then ready for service. It should be remembered, however, that there are many kinds of boiler scale, depending on the composition of the water used, so that the efficacy of this method in any particular boiler can only be ascertained by trial.

Other kinks which should be remembered are to keep the flues clean by frequent attention to them, and not to shake the fire too hard, as this often causes coals which are only partly burned to fall through into the ashes.—F. H. Sidney, Wakefield, Mass.

### Snow Scraper Made from Rake

A rake in wintertime is almost as useless as a snow scraper in summer; therefore a device which enables the rake to be converted into a snow scraper will practically make two tools out of one. This is easily done by getting a 1-in. board, about 9 by 18 in. in size, and fastening it onto the rake by some such means as is shown in the photograph. Strips should be nailed

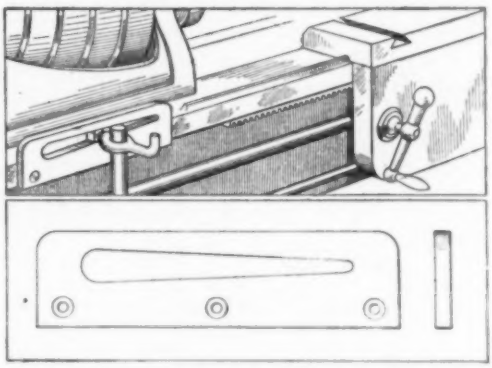
Converting the Rake into a Snow Scraper Enables the Same Tool to be Used the Year Round for Two Widely Different Purposes

across the ends of the board to strengthen it. For light snowfalls especially, the tool will be found even more useful than the ordinary snow shovel.—J. H. Shadek, Oradell, N. J.

### Wrench for Setscrews in Dogs Attached to Lathe

A simple addition to the bed of a lathe will save time for workers who have frequent use for dogs of various sizes. In using this form of wrench, instead of holding the work in one hand with the dog attached, and tightening or loosening the screws with a wrench held in the other hand, the work itself forms the wrench, and the setscrew head is inserted in the tapered slot which grips it like a vise.

The advantages of this form of wrench are, of course, that it is always handy and never gets lost, that it takes all ordinary sizes of setscrew heads used on lathe

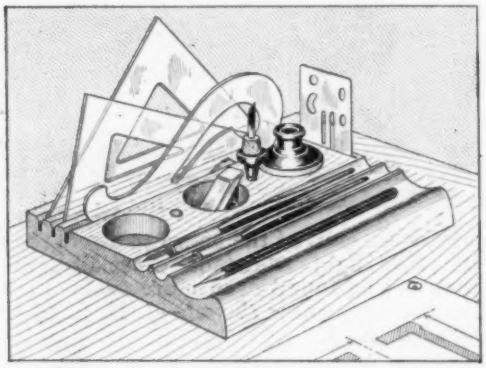


A Sheet-Iron Wrench Attached to the Lathe Bed Saves Time in Loosening and Tightening Setscrews in Lathe Dogs

dogs, and that the operation of tightening or loosening the dog requires fewer operations, and therefore less time when this form of wrench is provided.

### Handy Rack Holds Draftsman's Tools

A rack, which will keep most of the draftsman's tools safe from being pushed off the table, is easily made from a single



**The Draftsman Who Keeps His Tools in a Rack will Have Less Trouble in Finding Them and More Room on His Table**

block of wood. The work will, however, be much easier if a buzz saw and some large auger bits, or an expansion bit, are available. The size of the block can be varied to take different combinations of triangles, ink bottles, etc. In the rack shown, the three circular holes are suitable either for a bottle of ink, or for holding such small objects as erasers, extra leads, or thumb tacks. Small holes beside these are made to hold the ink-bottle stoppers. Any number of semi-circular grooves can be made in front; if red and black ink, for instance, are both used, one groove may be painted black and the black penholder used in black ink may be kept in it, another groove being similarly painted red for the red pen. —D. D. Symmes, West Haven, Conn.

### Building Heavy Doors in Place Saves Trouble of Hanging

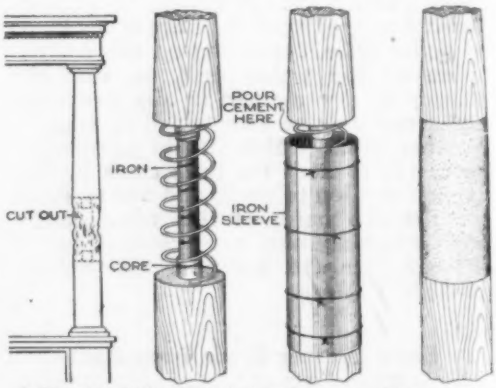
When heavy barn or outbuilding doors are to be hung, many farmers build the doors complete and then hang them. It is thus often difficult to prevent sagging while mounting the hinges. A better way is to nail in place the frame for the door, the nails being driven in only part way. The door planks are then cut and fitted in place, as though they were to be a stationary part of the structure. Sufficient space must, of course, be left around the door openings so that it will swing freely. When all the door planks are in place, the hinges are attached, and the nails holding the frame in place are drawn out, allowing the door to swing free. Double doors may be built in one piece, and sawed in two in the middle after the whole door is completed.

### Small Piece of Glass Is Useful in Tool Grinding

When grinding a tool to a master gauge or template, or to cut a standard thread, lay on the tool a small piece of window glass, and place the gauge flat against the other side of the glass. A piece of glass, 1 by 2 in., is a great convenience in a mechanic's tool box. To prevent cutting of the fingers, the edges may be smoothed down with a whetstone.

### Repairing a Pillar with Cement

A wooden porch pillar, which has rotted out at one point, may be repaired at a very slight cost, as shown in the sketch. First cut out the rotted portion, leaving projections on both ends at the center of the pillar, as shown. Cut a piece of iron pipe, just long enough to drive in between the two pieces, and wind some stout wire around to act as reinforcement. Then bind a piece of sheet iron around the lower segment, extending up to within about 2 in. of the upper segment, leaving enough space for pouring cement. Line up the top of the sheet iron with the surface of the upper part of the pillar, and pour full of cement. After the cement has dried for about three days, remove the sheet iron, fill the




**A Wooden Pillar Which has Begun to Rot can be Repaired Quite Satisfactorily by Means of a Piece of Pipe, Covered with Cement**

gap with cement, and trim up defects. If the repaired post is repainted, the joints will be scarcely noticeable.—E. Stumpf, Jersey City, N. J.

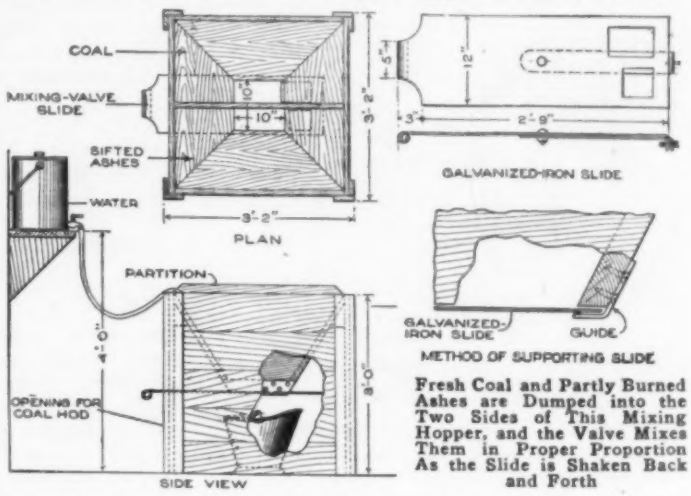
# Save Coal by Burning Ashes

By P. P. AVERY

IT is quite well known that when fresh coal exclusively is burned in a large stove or furnace, the ashes which are shaken down nearly always contain a considerable proportion of unburned coal or coke. Anyone who is careful of the amount of coal he uses must take some means of recovering the good coal from the ashes, and burning it over again. To do this, it must be mixed with fresh coal, and mixing it in the proper proportion with a shovel, or with several coal hods, is sometimes a job which is so tedious as to be frequently neglected, sometimes to the extent of even wasting the partly burned coal.

With this in view, a mixing hopper was constructed in an old wooden box. The bottom of the hopper is made to come about 13 in. from the floor, so that a coal hod can be set under it; this bottom consists of a valve, or slide, made of heavy galvanized iron. In it are two rectangular holes, one for each of the two halves into which the hopper is divided by a wooden partition. One of these openings is made 50 per cent larger than the other one, because it is necessary for best results to have a rather greater volume of fresh coal than of the partly burned coke. The back end of the iron slide is bent down slightly, in order to prevent it from slipping out from the two guides which support it at the sides, and the front end is shaped to form a handle, either by bending it over, as shown, or by cutting out a hole to fit the hand. Underneath this part, the front side of the box is cut out large enough to permit the coal hod to be pushed in. It is better not to have any more of the box open than just what is necessary in order to insert the coal hod, because the sides of the box are effective in keeping the dust confined.

In using the hopper, the coal is dumped or shoveled into one side, and the ashes, thoroughly sifted and cleared of clinkers, are thrown into the other side. With the empty coal hod standing underneath, the valve is pulled out and pushed back several times, or until the coal hod is full. The fuel will be thoroughly mixed, in the proportion which is fixed approximately by the relative size of the two openings in the slide. The exact size of these openings will, of course, depend somewhat on the kind of fuel burned. It will therefore be advisable at first to cut the larger of these openings slightly smaller than the half of the hopper bottom, so that either opening can be enlarged if the mixture is not just right. If still more accurate results are wanted, it is entirely possible to attach to the bottom of the slide a strip of iron which swings on a pin, as shown in the detail, so that a slight change in its position increases the size of one opening and decreases the size of the other.



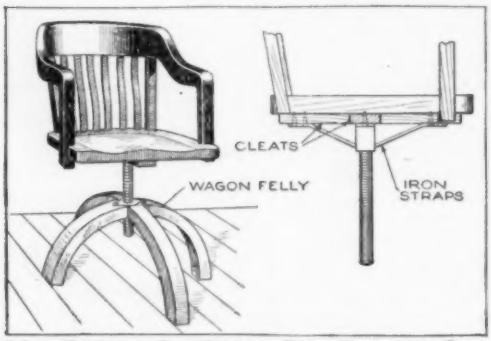

**Fresh Coal and Partly Burned Ashes are Dumped into the Two Sides of This Mixing Hopper, and the Valve Mixes Them in Proper Proportion As the Slide is Shaken Back and Forth**

A good deal will depend, of course, on the skill developed in using the mixing hopper, as, for instance, the handling of the slide. The mixing will be much more thorough if the slide is kept in motion, by shaking it back and forth while the fuel is falling through. Better results will often be obtained by sprinkling the ashes with water; a 5-gal. oil or gasoline can filled with water can be mounted on a shelf near the hopper, and a rubber hose then makes this sprinkling very easy. The partition should be built a few inches higher than the sides of the box, so as to make it less likely that stray lumps of fuel will fall into the wrong side of the hopper. By this thorough mixing, in the proper proportion, of fresh coal and partly burned ashes, the weekly coal consumption of an ordinary kitchen range, carefully measured, was reduced from 14½ hods a week to 10 hods, the amount of cooking and heating being the same.

The mixture is especially useful for banked fires in cold weather, which need not be very hot, but must last through the night.

### Swivel Chair Made from Wagon-Wheel Fellies

A useful and not ungraceful swivel chair was made by removing the broken

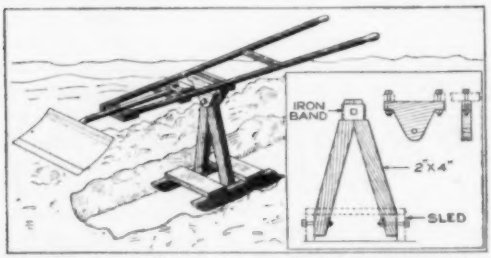



**After Having a Leg Broken, This Chair was Converted into a Swivel Chair by Mounting It on Two Pieces of the Felly of a Wagon Wheel**

legs of an old chair and mounting the good portion on a base made from two pieces of wagon-wheel fellies. An iron bar, 1 in. in diameter, was threaded and made to work easily through a threaded hole in the fellies, strengthened by the addition of a metal blade on top. On the bottom of the chair seat, two wooden strips were fastened with screws, at right angles to each other, crossing in the center. The end of the iron rod, sharpened to a square point, was driven into a tapered hole in this center, and was braced by two iron strips, tapped out to take the thread on the bar, screwed into position as shown, and fastened with screws.—Charles Black, Jr., Hightstown, N. J.

### Lever-and-Fulcrum Snow Shovel Makes Heavy Shoveling Easy

For heavy snowfalls a hand-derrick shovel gives the user a great advantage

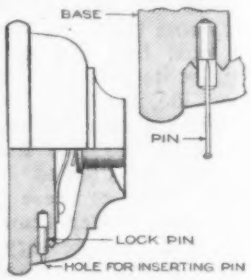



**The Lifting of Heavy Shovelfuls of Snow is Avoided by Mounting the Shovel on a Fulcrum**

over the old-style shovel. Simply mount on a sled an upright frame made of 2 by 4-in. lumber; upon this as a pivot, a pair of handles is bolted, to which is attached an ordinary shovel. The upright frame is 24 in. high, and it also swings, on the two bolts at the bottom. The width of the sled is 12 in. The sled is made of two pieces of 2 by 4-in. timber, with lighter pieces nailed across. The handles are 5 ft. long, or more; three braces hold them secure for heavy lifting. Large screws fasten the handles to the triangular-shaped pieces, and bolts hold the shovel to the handles. At the rear the handles are 2 ft. apart and taper to 3 in. apart in front.—F. E. Brimmer, Dalton, New York.

### Push Button Locked against Interference by Children

Many small boys take pleasure in unscrewing covers from electric push buttons, often losing or disconnecting parts of them. The illustration shows how they may be protected against interference by anyone who does not understand the method of opening them. Unscrew the cover or cap, and determine the thickness of the base, which carries the thread; then replace the cap and bore a hole, just large enough to take an ordinary brass pin, through the cover and the base. Unscrew the cover, and enlarge the inner part of the hole, in both base and cover, so as to take a lock pin made of wire, about ⅛ in. in diameter. The lock pin should work quite freely in this hole. Now insert the lock pin in the base and hold it in place with a piece of paper or a key, until the cover is screwed on. After the cover is screwed clear into place, the lock pin will drop, preventing the cover from again being removed until the lock pin is released by upward pressure of a common pin through the small hole.




### Renewing Old Electricians' Tape

Electricians' tape which has been used, or has dried, can have its stickiness restored by immersing in strong hot soapsuds, and leaving until the solution has penetrated. It is then taken out and

hung up to dry, being rolled up as soon as it reaches the required stage of "stickiness."—Fred C. David, St. Joseph, Mo.

### Using Soft-Coal Screenings with Anthracite

The following idea may be of benefit to many householders who have only a small amount of anthracite on hand:

First, secure a load or two of soft-coal screenings, No. 1 grade if possible. Second, sift all the refuse from cooking stove and furnace, and after picking out the slate and clinkers, mix an equal amount of the screenings with the sifted cinders (not the fine ash), and use the mixture in the furnace. If the soft coal is a noncaking fuel, it will neither harden over nor clinker, and practically all the anthracite as well as the screenings will be consumed; furthermore it will give a lasting fire.

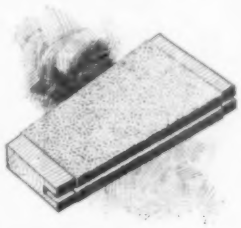
Using cinders alone with anthracite makes a dirty fire with lots of clinkers, and I have found from experience that when cinders are used with anthracite alone, it requires quite a few siftings to consume even the first cinders used. No doubt this is the reason for the great waste of cinders in private houses. The mixture of cinders and screenings makes a great deal less smoke than the best grade of soft-coal lump. This is no doubt due to the fact that the anthracite cinders are of practically the same composition as coke; that is to say, nearly pure carbon.—James E. Noble, Portsmouth, Ont.

### Breastplate for Brace and Bit

When using a brace and bit, or a hand drill, on a job which requires considerable pressure, a large surface by which the pressure can be applied will make the job much easier. The end of a common tin can, nailed to a round wooden disk about 10 in. in diameter, forms a handy device for this purpose. By placing the end of the brace inside of the can and the disk against the operator's body, considerable pressure is applied quite easily.—A. M. Fairfield, St. Marys, Kan.

### Sandpaper Held Firmly on Block by Its Tapered Shape

A neat form of sandpaper block has its two sides slightly out of parallel, one of them having a slot into which the edges of the piece of sandpaper are folded. The paper will be clamped quite tightly by pushing it toward the larger end of the block, or instantly released by pulling it toward the small end. In using the block, if it is held with the small end toward the workman, the index finger resting on the large end, there will be no tendency of the paper to slip out of place. Blocks embodying this principle can, of course, be made of various shapes, and with corners curved off to any radius to fit fillets in the wood to be sanded.—Henry Wedde, Chicago, Illinois.



### Using a Barrel as a Mouse Trap

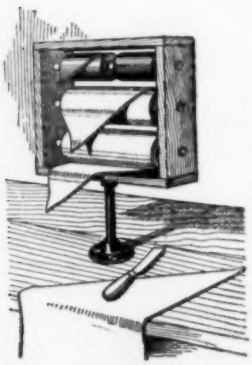
When difficulty is encountered in ridding a place of mice by the ordinary methods, try this one: Get a fairly tight barrel and bore a hole near the bottom to serve as an entrance. Throw into the barrel a quantity of shavings, or any material that would be useful to the mice in forming nests. Add some grain to serve as an additional attraction, and then cover with a piece of wood. Let the barrel remain in a place infested with mice for a week or ten days. At the end of this time numbers of the creatures will have taken up their abode in the barrel, and be busy nest making. Then stop up the hole in the bottom with a cork or wood plug of proper size, lift up the cover of the barrel a little, and pour in water until there is sufficient to drown the occupants. The trap may be emptied and, after drying, set up again. In this way a locality is soon cleared of mice.—S. Leonard Bastin, Bournemouth, Eng.

### Pinch Bar Made from Buggy Axle

When an old buggy is thrown on the scrap heap, its axle can be made by any blacksmith into a handy and durable pinch bar or crowbar. The size and weight of the axle make it well adapted to this purpose.

### Convenient Rack for Rubber Gum and Fabric

Vulcanizers will find this rack convenient and practical. It keeps the repair stock clean, and permits several men to work at the same table without interfering with each other. The wooden frame, made to hold several rolls of gum and fabric, revolves on a stand fastened to the table. It can be turned in any direction, to accommodate workmen at the opposite ends of the table.

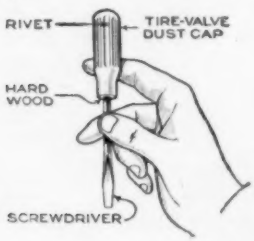


The frame is of lumber, 4 in. wide, with holes bored through the sides to hold the rolls. The rack revolves on a piece of half-inch pipe, threaded on one end to fit a flange, which is screwed to the center of the table. On the bottom of the rack another flange is screwed, in which the pipe should turn easily.

On the ends of the rack may be hung knives, rollers, stitchers, scissors, etc., thus keeping the table clear of working tools and allowing more table space. The entire contrivance is so simple that any vulcanizer can easily construct one.

### Screwdriver Handle Made of Dust Cap from Tire Valve

An ideal screwdriver handle is made from an old dust cap, such as used on automobile tire valves. A piece of hard wood is driven into the cap as tightly as possible, a rivet is then driven through, near the upper end, to prevent the wood from turning in the cap, and a hole is drilled in the wood at the open end, somewhat smaller than the round rod which forms the blade. The latter, which may be a piece of drill rod ⅛ to 3/16 in. in diameter, should be beveled off to a chisel edge, driven into the handle, and then ground to the proper shape for use as a screwdriver. The dust cap forms a durable handle and ferrule in one piece, and has the additional advantage that it is of distinctive appearance, and is so made that a very firm grip can be taken upon it with the hand.

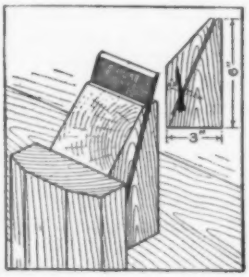



### Partitioning Off a Room to Save Heat and Coal

In very cold weather, it may help greatly to save coal if the expedient is adopted of hanging curtains across a large room, so as to confine the heat of the stove or radiator to the part of the room actually required for use. The curtains may consist of blankets hung on a wire. A space of, say, two feet may be left between them and the ceiling for ventilation, without impairing greatly the efficiency as a coal saver.—Eric Warren, Corpus Christi, Tex.

### Clamping Block for Filing Scraper Blades

Scraper blades are awkward to file, unless a special vise adapted for such work is at hand. If merely put into the ordinary vise it is necessary to let the blade stick out so far, in order to permit the file to be worked at the proper angle, that the blade bends at every stroke. This is not much bettered even by supporting it by one or two pieces of board, for though the blade then does not bend, the operation of clamping is made awkward, and the blade is still in a vertical position, which lends itself badly to the filing of a bevel.




The filing block shown in the illustration, made in a few minutes from scraps, grasps the blade firmly just back of the cutting edge and holds it in an inclined position, which makes it possible to hold the file level. It is made by simply ripping diagonally a block of 3 by 4-in. stock, beveling off the upper portion of the front piece, as shown, and connecting the two by countersunk screws, placed near the bottom end, which are screwed in tight enough to hold the scraper blade while filing.—Henry Simon, Laguna Beach, Calif.

### Keeping Collapsible Tubes Inverted Prevents Contents Drying Out

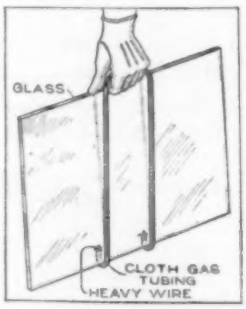
Paint, tooth paste, or other materials kept in collapsible tubes, will sometimes separate, and the oil will squeeze from the tube first, leaving the remaining substance dry. After each time of using, it will be more dry than before, and the last of it may be too dry to be squeezed from the tube. This occurs because the solid matter sinks to the bottom, and may be remedied by keeping the tube in an inverted position. To facilitate this, make a small hole in a wooden block, into which the cap of the tube can be pressed, the block serving as a base or holder for the tube. If the cap is sufficiently tight in the block, the latter will also be of use in unscrewing the cap.

### Making Special Angles and Curves for Drafting Jobs

Draftsmen who often have occasion to draw certain curves or angles will save time and work by cutting their own irregular curves and angles out of sheet celluloid, fiber, or hard rubber, using a pattern of heavy paper pasted to the material as a guide, cutting with a scroll saw, and smoothing the edges with a fine file. Often a standard angle or curve can be altered very easily to the required pattern. —J. Horace Van Nice, Chicago, Ill.

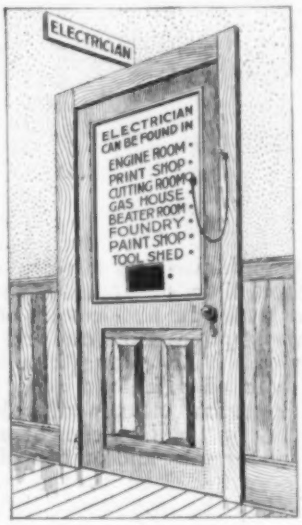
### A Handy Wire Hook for Carrying Window Panes

Carrying a pane of glass is a job which, although apparently easy, causes much loss of temper. If the pane is wrapped with paper, there is often danger that it will slip out of the hand and fall. If it is not wrapped, the edges are likely to cut the hand. One who provides himself with an old glove, and a piece of stiff wire inside of a long, heavy cloth-covered rubber tubing, will find the difficulty practically solved. The wire is used as shown in the illustration, and the glass is held from tipping out by a slight pressure of the thumb.—Henry W. Kingston, Milwaukee, Wis.




### Signboard Shows Where Workman is to be Found

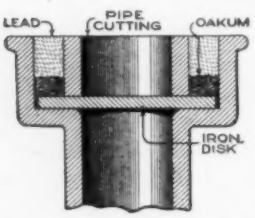
An electrician in a large mill installed on the door of his shop a signboard which saved much time for his fellow employes. When out working in the mill, his shop door was always left closed, and when electric trouble developed in a distant part of the mill, much time was often wasted in finding him. The device consisted simply of a wide board attached outside the shop door, having painted upon it the names of the various departments in the mill where electrical work frequently had to be done. In front of each was drilled a small hole in which could be inserted a plug hanging by a string from a nail in the door casing. When the electrician left his shop, he simply inserted the plug in the proper hole, which notified callers immediately of his whereabouts. Parties calling him by telephone and receiving no answer could call the department opposite his shop and inquire where the electrician was, the question being answered by a glance at the board on the door.




A small piece of slate was inserted in the board below the painted letters, and a plug hole was also made beside this slate. When going to a place not covered by the painted signs, the electrician noted this on the slate with a piece of chalk, and inserted the plug opposite it. The plug was provided with a conspicuous white head made of an old porcelain insulator, and was hung by a cord from a nail in the casing, near the door knob. Thus the door could not be opened without removing the plug from the hole, and there was no danger of the electrician returning without indicating it by removing the plug. This idea could be made use of by many tradesmen. — Frederic Doremus, Passaic, N. J.

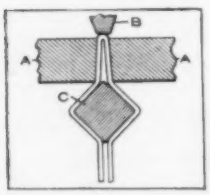
### Closing Cast-Iron Pipe Ends without a Plug

When making some changes to a water system in a country town, it became necessary to cut out several lengths of 12-in. cast-iron pipe. The pipe ends on the remaining pipes therefore had to be plugged at once, and it developed that there were no plugs of proper size on hand. The foreman hunted up a piece of ¼-in. sheet-iron plate, and cut out several circles on a lathe; he also cut an equal number of short pieces from one end of the removed pipe. Placing the iron disk and short piece of pipe in a pipe hub, he calked in several strands of oakum, soaked in one of the iron-cement mixtures which are for sale, and on top of this he poured in melted lead to the top of the hub. When the lead cooled, it was well calked in. All the joints so made were found to be water-tight, and nearly as easy to remove as the regular plugs. This was done by cutting out the short pipe ends with a hammer and cold chisel. No trouble was experienced with ends splitting from the pressure caused by the lead calking, nor did the joint leak through the oakum.



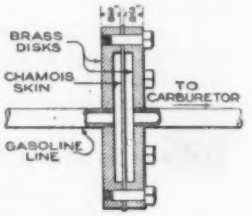

### Compressing Spring Wire While Bending Preserves Strength

In making forming dies for bending spring brass wire, it is usually found impractical to bend the wire to a very short radius, because the wire either breaks at this point during the forming, or is so weakened that it breaks afterward, while in use. Very successful results in the way of bending wire to a short radius have been obtained by compressing the bend at the time it is being made, so that the wire is shortened, rather than lengthened, and the metal is made more compact. In the example illustrated, brass wire is being formed into a garter, and the bend is compressed by the jaws A, and forced with considerable pressure against the fixed pin B. The work is prevented from slipping away from B by being bent around the square form C. A wire garter formed in this way was used steadily for two years, without breaking, showing that the wire at the sharp bend had not been appreciably weakened.




### Chamois-Skin Gasoline Filter Avoids Carburetor Troubles

A permanent filter in the gasoline line of an automobile will tend to minimize sediment and water in the gasoline supply. Two brass disks, a circular piece of chamois, and two brass screws are all that is needed. The disks are cut to 3½-in. outside diameter, and recessed out on the inside to about 2½ in. in diameter. The depth of the recess need not be more than ⅛ in. in each disk. This filter, if kept clean and tight, is a positive assurance against water and dirt getting in the carburetor.—Peter J. M. Clute, Schenectady, N. Y.

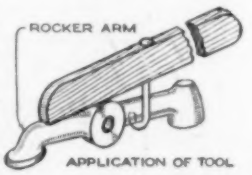



### Lubricated Varnish Eliminates Trouble with Sliding Drawers

To make bureau drawers and other wood surfaces slide easier, add a tablespoonful of powdered graphite to a pint of shellac varnish; stir well to mix it, and apply with a brush; dry 4 to 10 hours before using. One coat is usually enough. —E. L. Howard, Springfield, Ohio.

### Tool for Lifting Rocker Arms on Overhead-Valve Engines

A very convenient tool for releasing the push rods on overhead-valve engines is shown in the sketch. The tool is made from a piece of hard wood, or metal, with a round rod riveted securely and bent as shown. By pulling upon the lever, the valve is moved downward, compressing the spring until the rear end of the rocker is clear of the push rod, which is then removed.—Charles Stuart, Dallas, Texas.

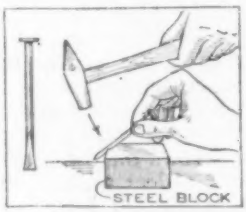


### Renewing Enlarged Orifice in Burner

The burner orifice on a blowtorch became so enlarged that it would not burn with a hot blue flame, but with a sooty yellow flame, with raw gasoline spurting out at times. It was impossible to obtain another burner. As a temporary repair, the needle valve was removed, and the flame tube turned off with a pipe wrench. With a ball-peen machinists' hammer, several light blows were struck on the soft bronze burner, which completely closed the orifice. The needle valve was turned back in place just tight enough to pierce through the bronze, making a new orifice much smaller than before. After reassembling the torch it burned perfectly. It has been in daily use for a month since and continues to work well. When the burner becomes enlarged again, the repairing process can be repeated.—John P. Robinson, Hillsdale, Mich.

### Preventing Nails from Splitting Wood

When nails have to be driven into a piece of wood which is so thin or narrow that there is danger of splitting, this danger may be much reduced by providing nails with a chisel point such as is used on railroad spikes. To avoid splitting ties, a railroad spike always has a chisel edge and is used with this chisel edge laid parallel to the rails, or across the grain of the tie. Small nails may be sharpened this way by laying them on the sharp edge of an anvil, or other heavy steel block, and striking a heavy blow with a hammer, which will cut off the old point of the nail, and flatten the end to the shape desired. If the flattened end is too wide, it may be dressed off with a file.—Walter L. Morrison, Crozier, N. Mex.



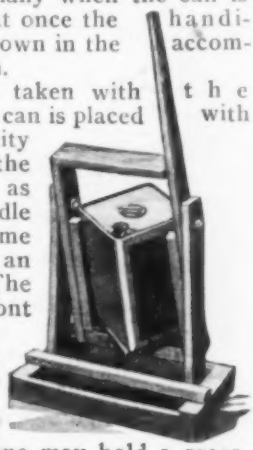

### Desk Drawers Made of Bread Pans

In remodeling an office desk, new drawers were made of ordinary bread pans. One end was finished off flush by means of a wooden wedge, to which a face-board and handle were attached. Such drawers slide easily, being supported by the rim of the pan, and are not difficult to keep clean.—E. O. Tetzlaff, Cicero, Ill.

### Frame Holds Oilcan and Tilts for Pouring

Anyone who has tried to pour oil from a square can, especially when the can is full, will recognize at once the handiness of the frame shown in the accompanying photograph.

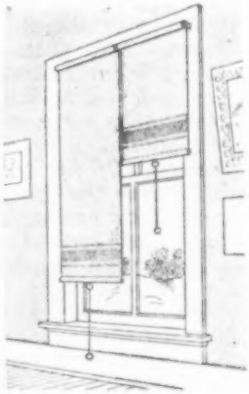
The picture was taken with the frame tilted, but the can is placed with its center of gravity slightly back of the fulcrum, so that as soon as the handle is released, the frame swings back into an upright position. The piece across the front prevents the frame from swinging beyond the perpendicular position.



By the use of this arrangement, one may hold a receptacle in the left hand close to the spout, tilt the frame with the right hand, and pour as fast or slowly as desired without danger of spilling oil on the floor. Various methods of clamping the can will occur to the maker, to prevent it from slipping out when nearly empty and turned almost upside down.—Harvey Mead, Scranton, Pa.

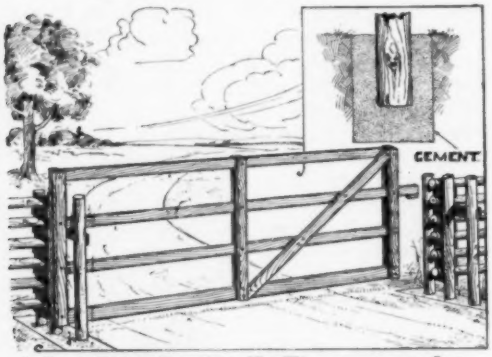
### Divided Window Shades Permit Fine Adjustment of Light

The device of using two shades, side by side, on a wide window, instead of one, is useful in a number of places; especially in the sick room it will often allow sunlight to enter a room from which it would otherwise be excluded because it might shine too directly on the patient's eyes. In many shops and drafting rooms, also, the device will pay for itself in the convenience which it brings. When both shades are to be raised or lowered at once, no extra time is required, as one hand can be used on each shade.—R. Lee Sharpe, Carrollton, Ga.



### A Durable Hingeless Field Gate

All field gates should be made higher than the fence, because restless animals try the gate in preference to the fence.




**A Gate Which Requires No Hinges, cannot Sag, and is Easily Swung Open or Closed**

Where the gate does not have to be opened very often, the sketch shows a construction which is more durable and often more convenient than hinges. To open this gate, the end at the right is lifted from the bar between the two posts, on which it rests, and is slid along, resting on the cross bar at the other end of the gate, until the cleat across the center of the gate touches this cross bar. The gate is then almost balanced or supported at its center and can be swung around at right angles with very little exertion. This cross bar, on which it is swung, is securely fastened to two posts set at an angle of 45°, as shown.

Any shocks which may come to the gate structure, such as by animals running against it, are taken by these upright posts direct, instead of through hinges. The posts should therefore be set firmly in concrete. A gate with four bars will be sufficient for dairy cows; where hogs or horses are pastured, the gate should have five bars. For hogs, there should be a pole or bar of some kind under the gate, partly buried in the ground, or better, a sill of cement. A good width for such a gate is 14 ft. clear, or 15 ft. total length of gate. A block, at the extreme right end of the gate bar which rests on the bar between the posts, will eliminate any danger of the gate being pushed open by animals.—Herbert A. Shearer, Chicago, Ill.

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¶To prevent a round-head bolt from turning in wood or metal, drive a prick punch, close to the edge, through the head and hold the punch while turning the nut.

### Grooved Pulley Made of Barrel Heads

It was desired to drive a small emery wheel by a round belt from the flywheel of a gasoline engine, whose speed was only about one-eighth of the speed desired for the emery wheel. A large sheave was, therefore, required for attachment to the flywheel. To make this sheave, two 16-in. barrel heads were used, placing them together so that the beveled edges flared outward, and the grain of the two pieces was at right angles to each other. The two barrel heads were fastened together firmly with glue and screws, and were clipped to the arms of the flywheel, a large hole being made in the center of the sheave for the engine shaft and governor. The sheave was centered by measuring, and making equal, distances from several points on the edge of the sheave to the outer circumference of the flywheel.

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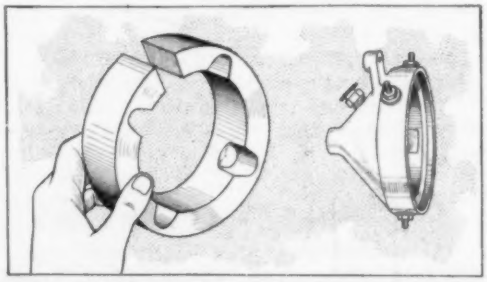
### Chuck Holds Auto Timers for Refinishing

The inner surface on automobile timers wears quite rapidly, and after the car has run 3,000 or 4,000 miles, it is often so uneven that the roller does not make good contact, but jumps from one high spot to the next, causing the engine to miss fire. These timers are not expensive, and are often thrown away without any attempt to resurface the part, largely because the terminal screws on the timer case make it a difficult object to hold in the lathe chuck. Confronted, however, with the present scarcity of materials and parts, one shop has made from cast iron a jig, or special chuck, into which the timer fits, the jig being then held in the lathe chuck. The slot in the piece of iron



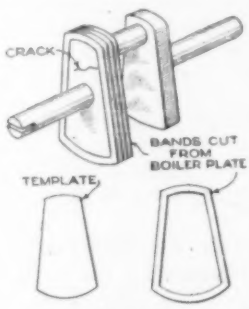
**Rather Than Throw Away a Number of Worn Automobile Timers, It will Conserve Material if They are Placed in a Jig, Such as This One, and Resurfaced in the Lathe**

gives it sufficient elasticity to grip the timer firmly when screwed up in the chuck. A universal chuck must not be

used, because the outer surface of the timer varies considerably; the part must be centered with reference to the metal contact surface under the terminal screws.

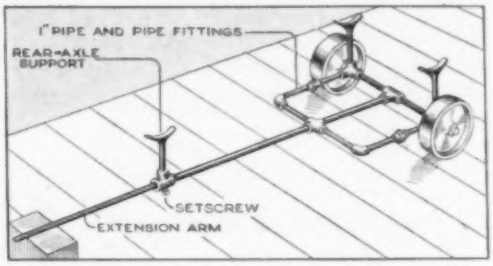
### Emergency Repair for a Crankshaft with a Cracked Web

The crankshaft of one of the pumping engines on a ship was found to have developed a crack in its web, which prevented proper working of the engine, and threatened to put it out of service altogether. As it was hardly possible to get a new crankshaft at the time, a repair was made by this method: A template was cut, the exact shape of the web of the crankshaft, except that it was 1/64 in. shorter. By means of this template, three bands were cut, out of ½-in. boiler plate, of the shape shown. The inside surfaces of these bands were fitted closely to the template by filing. The crankshaft was then placed in a vertical position, a hole being drilled through the web at the end of the crack to prevent it from extending farther, and the bands, heated red-hot, were slipped over the web. When cool, they bound the defective web together with tremendous pressure, and enabled the crankshaft to be put back into service. The crack was found to have been caused by the bearings being somewhat out of line, and after this condition was corrected, the engine ran satisfactorily, in spite of the extra weight on the crankshaft.




### Loading Truck Facilitates Handling of Auto Chassis

When loading automobile chassis on freight cars considerable twisting and prying is usually necessary to get them in through the narrow doors. To simplify this operation, a truck, as shown in the sketch, was devised. It consists of two heavy metal wheels attached to a substantial axle, and a tubular extension carrying three supports. The supports are so arranged that they fit onto a convenient part of the front axle and hold the chassis from slipping sideways. The third support engages the differential of

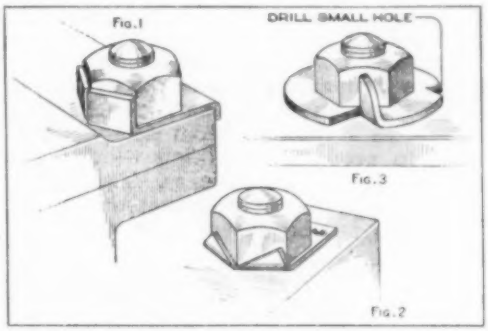



Auto Chassis, Which Are Heaviest at the Front End, are Readily Handled with This Truck

the car. In operation, the truck is wheeled about by means of the extension handle.

### Easily Made Lock Washers

These three types of lock washers are the invention of a practical mechanic; each of them has been tested and found efficient. They have the advantage of being both cheap and easy to make. In Fig. 1, the washer is cut oblong, the hole is drilled in the center, and one end is split and spread. This washer is slipped on, and the two tabs are bent up against the flat sides of the nut, while the other end is bent downward over the edge of the part held. Fig. 2 shows a common square washer, made of 1/16-in. sheet iron. When washer and nut have been tightened down, a prick punch is driven into two corners, and the other two corners are bent up against the flats. Fig. 3 is a common round washer, slotted as shown with a hacksaw. A small hole is drilled in the work in any place at the edge of the washer, and a section of the washer

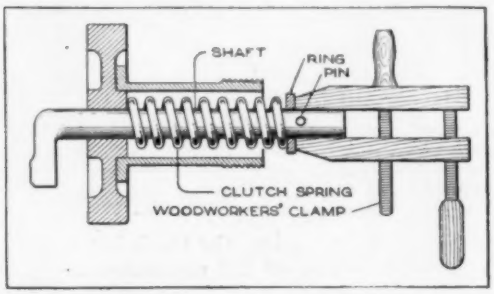



Three Types of Lock Washer Which are Easily Made and Useful in Machinery Which is Subject to Vibration

is drifted into this hole. The larger lug is turned up at right angles, so that it bears against the nut.

### Compressing Stiff Clutch Springs with Woodworkers' Clamp

A woodworking clamp is a good tool for removing and replacing the clutch springs on automobiles. The clamp jaws




**A Woodworkers' Clamp, Driven On with a Hammer, Compresses the Clutch Spring, So as to Extract or Replace the Pin**

are simply tightened on the shaft, with the ends bearing against the ring, or collar, which retains the spring in position. The clamp is driven on with a hammer, compressing the spring until the retaining pin can be removed or replaced, as desired. The advantage of the clamp method is its adaptability to different sizes of shafts. Often, too, awkward places, in which springs are difficult to compress, can be easily reached by the protruding ends of the clamp jaws.—G. A. Luers, Washington, D. C.

### Fuel-Saving Kinks Valuable in the Home

If the fire box of the stove is partly filled with bricks or stone, leaving the center for the coal, a fire can be made with less coal, which will have more heating ability than it would have without the bricks or stone to absorb the heat.

Too much heat in a home, that is to say, any temperature above 68°, the point which has been set by the Fuel Administration as a proper room temperature, tends to produce something which dangerously approaches laziness. This is felt plainly when the temperature runs up to 75 or 80°, but is present even at 72 degrees.

Fires in bedrooms are unnecessary. A bed can be warmed before retiring, if absolutely necessary, by hot water in a bottle or jug, or by an electric-light bed warmer, and this will be found after use to be even more luxurious than a heated bedroom, and decidedly more sanitary and economical.

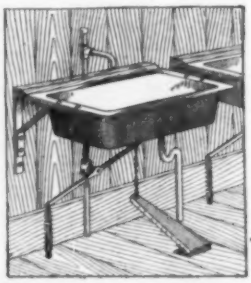
When the fire has died out and the room is beginning to get chilly, if one must still sit in it, place a kerosene lamp under the chair and it will save the necessity of firing up again.—B. W. Rice, Caldwell, Idaho.

### Pedal Switch for Emery-Wheel Motors

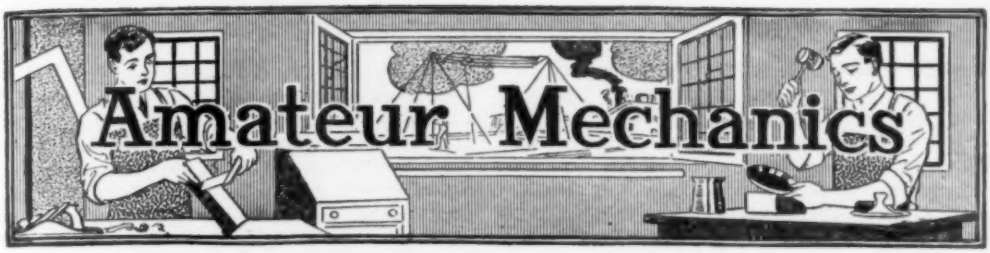
Emery wheels do not take a great deal of power, but when it is considered that they often run all day, while the total time during which they are actually used does not amount to more than perhaps half an hour, it will be seen that a considerable waste of energy is involved. One way to reduce this is to install a pedal control for the switch or belt shifter, together with a spring, so that the switch will be opened or the band shifted back to the loose pulley by the action of the spring, as soon as the tension on the pedal is released. It may, of course, be objected that a workman would have to wait a few seconds while the wheel was reaching its full speed, thus losing time, but in many cases, this time can be fully occupied in examining the tool to be ground, and determining the exact angle at which it is to be held.

### Foot Control Handy for Faucets in Washbowls

Foot control for the wash basin is recognized as the most convenient and sanitary method, and its adoption would be much wider than it is, if its advantages were better known. It will contribute wonderfully to the cleanliness and convenience of the shop washbowl, if a pedal is installed so that pressure, applied to it with the foot, turns on the water, it being turned off by a spring, when the foot is removed. In this way, the convenience of a steady stream of water is secured, while at the same time all danger of the water being left turned on by a careless person is eliminated.



¶Time can be saved in photographic work by making a mark on the bottle, to indicate the amount of hypo, or other material, usually weighed out in making solutions.

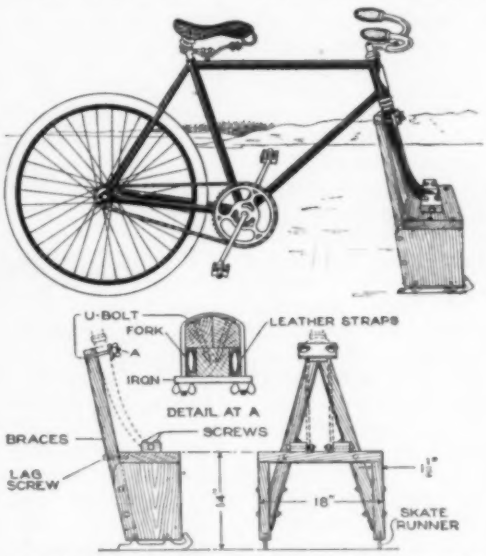



# A Bicycle Ice Speeder

By F. E. BRIMMER

AN ordinary bicycle, with the front wheel removed and a purposely built sled attached in its place to the front forks, makes a combination that will compete in speed with anything that travels on ice. It must, of course, be carefully constructed and used with due regard to its limitations. When these are learned, however, a great deal of fun can be obtained where a large ice surface is available.

The sled need not be heavy if properly built. The fork is fastened directly by two bolts to wooden blocks, which are in turn firmly attached by screws to a horizontal board, 18 in. long and about 7 in. wide. The ends of this board are screwed to two shorter pieces of 1-in. hard wood, whose height depends on the diameter of the bicycle wheels. If the ordinary bicycle with 28-in. wheels is used, these boards will be about 12 in. long, so that the runners and the top of the board will make the height of the front hub the same as that of the rear one, or nearly 14 in. The runners are simply two old skates, with the tops removed. The runners are sunk into slots in the wood, and fastened with nails passing through the wood. Care should be taken to see that the skate runners are accurately placed, with their edges exactly parallel with each other and with the edge of the board in which they are fastened.




**Two Old Skates and Some Scraps of Lumber, with a Few Screws and Boards, will Convert Any Bicycle into an Ice Speeder Which will Travel with Astonishing Velocity across a Frozen Lake or along a River**

Two braces, of sticks about 1½ in. square, are run from the top of the forks to the vertical boards which form the sides of the sled. By arranging them as shown in the sketch, they will act not only to brace the sled against swinging back if a stone or rough place on the ice should be encountered, which is, of course, their main purpose, but also to strengthen the sled itself against collapse. At their upper ends, these braces are firmly attached to the forks by a piece of iron rod, which is bent to a U-shape, threaded on both ends and sunk into the braces, and a small block which is placed between the forks. The metal forks should be protected against damage by inserting two small pieces of leather, as indicated; nothing but this leather will then come in contact with the finished metal. The size of the block should be made so that the forks will be gripped firmly but not tightly enough to injure them; the thrust from the sled is not taken by the friction of these straps, but by the pressure of the small block between the forks.

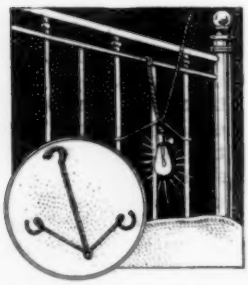
The speeder is propelled, of course, like an ordinary bicycle. If the rear tire slips too badly, it will be necessary to wind the tire and rim with wire, in order to provide traction. This will not be necessary, however, if the tire is nearly new and has a nonskid-type tread with projections on the rubber. One characteristic

of the construction may cause a fall unless it is understood at the start; namely, that, on account of the angle at which the front steering spindle of a bicycle is set, the speeder will have a tendency to lean outward, instead of inward, when rounding a curve. This tendency can be corrected, of course, by the rider leaning strongly toward the inside of the curve, as he does to some extent when riding an ordinary bicycle. The question will occur as to why two runners are necessary instead of one, corresponding to the front wheel. It is indeed possible to build a machine in this way, and it will be in some respects more satisfactory than when built with the two runners 18 in. apart; it will be found to steer somewhat easier at high speeds and will, in fact, be safer when traveling at high speeds. For the beginner, however, who should confine his efforts at first to mastering the peculiarities of this novel vehicle at low speeds, it is better to start out with a double-runner sled in front.

It should be noted, in conclusion, that, unlike many freak devices made for bicycles, this does not prevent, in any way, its usefulness for ordinary purposes. By removing two nuts, loosening the two wing nuts, and sliding the forks out from the U-bolt, the front wheel may be replaced in a few minutes, and the bicycle is ready to ride.

### Handy Electric Night Lamp for Emergencies

A handy bracket for an electric light on the bed may be made from heavy wire, twisted together for a length of about 15 in. At one end a hook is made, to fit over the top rail of the bed. At the other end, the two wires are spread out each way and bent back at an angle, so that the two free ends will span two or more of the upright rods in the head of the bed. The two ends of these curved pieces of wire are bent to form hooks. A wire loop is soldered at the place where the three legs of the holder come together, this loop serving to pass the lamp cord through, and hold the light. The hooks are padded so they will not injure the finish on the bed, and the whole apparatus is hung on the head of the bed, as shown, providing a handy night light within convenient reach.—G. I. Mitchell, Ruston, La.



### An Error Corrected

On page 628 of our October issue appeared an article entitled "Converting a Safe-Cabinet into a Safe." The use of the words "Safe-Cabinet" here was an error, as the process was intended to refer rather to the ordinary steel filing cabinets than to the particular product known as the "Safe-Cabinet," which is primarily a safe and not a filing cabinet.

### Kitchen Chair as a Back Rest for Invalids

Many persons confined to their beds are able to sit up in bed, but refrain from doing so owing to the strain the back must bear. This can be relieved by the use of an old kitchen chair, with the legs cut off close to the seat. The seat and the back can be covered with some kind of padding. When the patient wishes to sit up, the seat can then be slipped under him.—Gustave Schoeffler, Rahway, N. J.

### Steering Sled for the Small Boy or Girl

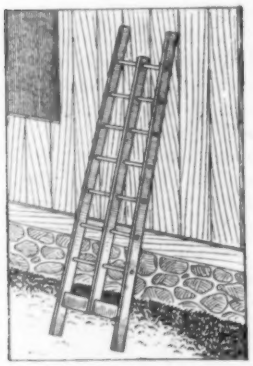
For the youngster who is not quite old enough to enjoy safely coasting on an ordinary sled, the three-runner affair illustrated will be a welcome toy. The sled is hardly suitable for coasting on hills, unless they are very gradual, but can be propelled nicely over hard snow on the sidewalk by the little one's feet. The length of the sled illustrated is 18 in. and the width 5 in. The seat is made of 1-in. pine, and the posts are pieces of old broom handle; the height should be such that the child's feet reach comfortably to the ground. A large nail through the steering post carries the weight in front, bearing against a large washer on the underside of the seat. The runners are of 1-in. ash, with steel shoes.

### Teeth on Back of Saw for Cutting Nails

On the back of the saw, at the end away from the handle, file a row of teeth about 6 in. long. They will be found very convenient for cutting off nails, especially while removing old casings.

### Central Beam Doubles Safety of Ladder

A ladder combining to an unusual degree the factors of strength, safety, and light weight can be made by interposing a central upright between the two sidepieces. This neither complicates the construction, nor does it add much to the cost, since relatively smaller timbers can be used. That is to say, a three-beam ladder is lighter than an equally strong ladder of the ordinary type.



In constructing the ladder, it is well to make the bottom rung of flat stock, and to mortise it into the end of the central beam. The three uprights can be clamped together and bored for the rungs all at once, since in this form of ladder it is not necessary to make the rungs thicker in the middle than at the ends. All the holes should make a tight fit. The third piece can be driven into place by greasing the rungs with paraffin, which, however, should be carefully removed later on, with sand paper.

The third piece binds all rungs together at exactly the point where the strain is greatest and rungs most often break; even if one-half of a rung should give way under one foot, the other foot would still be safe on the other half.

It will be found also that, far from being a hindrance in working, the central upright will rather prove an added convenience. It does not interfere at all with either hands or feet in climbing, but instead prevents sidewise slipping of the feet. A pail can be hung quite handily, without slipping, between the center beam and either of the side beams.—Henry Simon, Laguna Beach, Calif.

### Building an Imitation Battle Tank for Use in Parades

In many Liberty-loan parades the feature of interest has been an imitation

**A Tank, Made of a Light Wooden Framework Covered with Roofing Paper, Presents a Formidable Appearance in Any Patriotic Parade**

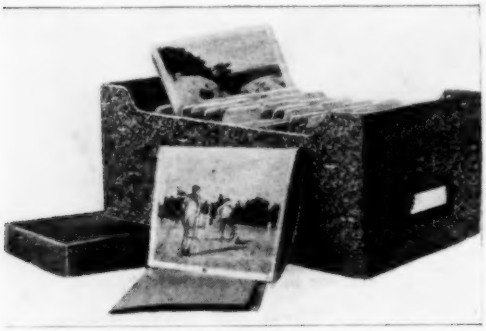
battle tank. These are inexpensive, and simple of construction. The tank which is here illustrated was made of ordinary roofing paper, over a frame of 1 by 4-in. and 2 by 4-in. boards, the latter used as braces. The whole was mounted on an ordinary light roadster, which furnished the motive power. One brace in the back was removable for driving the car inside the framework, a few simple knots were then tied, and the imitation battle monster was ready to go. The entire cost, exclusive of gasoline and wear and tear on the car, need not exceed $20.

### Cold Water Drawn from Bottom of Lake or Stream

Recognizing the fact that the water at the bottom of a lake or river is colder and cleaner than the surface water, a camper recently used the following device: Fasten a piece of cord to the handle of an old jug, and also to the cork, as in the illustration. Then fasten a stone or weight of some kind, so that the jug will sink easily. Lower the jug to the bottom of the lake; when it touches the bottom give the cord a quick jerk, thus pulling out the cork. When air bubbles cease coming to the surface, it will show that the jug is full, and it is then raised by the cord.—Clay Hewes, Albany, N. Y.

### Filing Prints and Negatives in Card Cabinet

Amateur photographers, who take any considerable quantity of pictures, usually find that the job of keeping the negatives and prints in such shape that they can be found when wanted, is one which is decidedly worthy of attention. Probably no better way of keeping the negatives and prints can be found than to use a standard card cabinet with guides between different lots of prints or negatives. Cabinets, or trays, made of heavy pasteboard, are obtainable at very moderate prices; a certain number of guides are usually furnished with them, and others can be readily purchased or cut from pasteboard. The negatives may be filed by date or by subject, or both; in any case, the wording written on the guides should be such as to identify instantly the pictures filed behind it. One of three sizes of card cabinets in general use, namely, 3 by 5 in., 4 by 6 in., and 5 by 8 in., will be found suitable for any size of photograph in common use among amateurs.—E. C. Blomeyer, Waco, Tex.



**A Standard Card Cabinet with Guides and Follow Blocks can be Put to Good Use in Filing Photograph Negatives and Prints for Ready Reference**

### A Novel Pencil Holder

An old fountain pen makes a novel pencil holder, and uses up small pieces of pencil which might otherwise be wasted. Remove the cap in which the pen is held, and screw the pencil stub in its place. The threads will hold the pencil firmly.

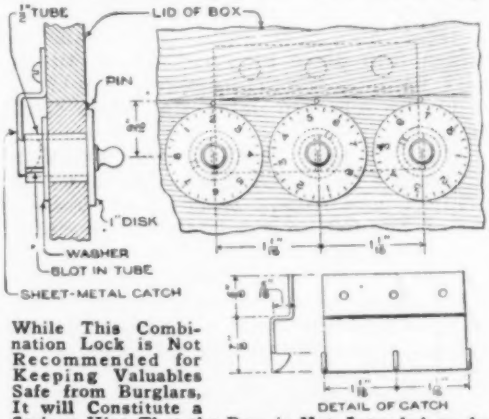
### An Inkless Pen

To make a pen that will write without ink, get a small quantity of violet aniline from a drug store, and some gum arabic. Dissolve a little of the gum in warm water, and mix with the violet aniline until a paste is formed. Apply it to the inside hollow of a new pen, just above the split. To write with the inkless pen it is only necessary to dip it in water. Shake away the drops, but do not wipe the pen. After a few moments it will be possible to write quite well. Such inkless pens last for a considerable time, and may always be renewed.

### Simple Combination Lock for Chests and Drawers

There are in this lock three cylinders, each of which engage the catch, and the three must release simultaneously to enable the box to be opened. Each cylinder is made of a piece of ½-in. tubing, ¼ in. longer than the thickness of the box. A metal disk, or button, 1 in. in diameter, is soldered or brazed to one end. The wall of the tubing is slotted for ¼ in. at the other end, the slot being just wide enough to accommodate the projections on the catch. Three ½-in. holes are then bored in the box, and the cylinders are inserted; metal washers are fitted over the tubing inside the box, and soldered, to hold the cylinders in place.

The catch is cut out of sheet metal, and bent to the shape shown in the diagram. Care should be taken to have the projections correctly spaced, so that all three will enter the slots in the cylinders at the same time. Before attaching the catch permanently, it is well to decide on the combination to be used. Stamp the figures on the disks, and see that the lock works well when the correct figures are set at the marking pins. The catch may then be screwed tight to the lid, and the lock is complete.—Kenneth E. Ernst, New York City.



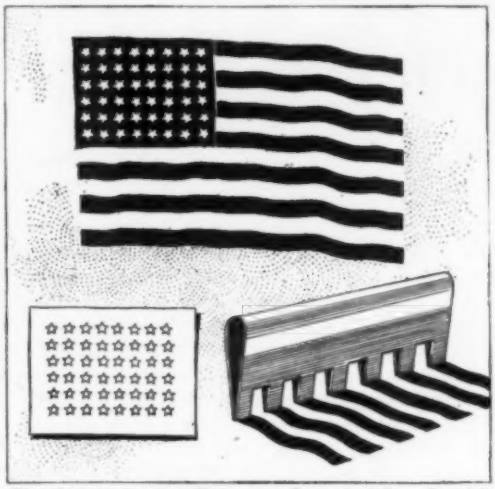

**While This Combination Lock is Not Recommended for Keeping Valuables Safe from Burglars, It will Constitute a Serious Hint That the Box is Not Intended to be Opened by Anyone Not Knowing the Combination**

# Drawing a Flag with Graceful Waves

By R. J. STEPHENS

KEEPING the flag constantly before us may serve as a reminder of the fact that our country is now engaged in a struggle, which calls for each one to do his part, not only at special times, such as when Liberty bonds are issued, but every day, when we eat, when we buy clothes, and when we have leisure time.

The American flag, while undoubtedly one of the most beautiful and significant, is more difficult to draw than most other important national flags. It can, however, be drawn quite easily and quickly by means of the ruling pen illustrated. This consists of a strip of tin, such as can be cut from a tin can, with six rectangular slots cut in each side, the piece being then folded over to the shape shown. By filling the space between the projections with red ink, the seven red stripes of the flag may be drawn, either straight or with curves to represent a waving flag. In using it, the paper should be placed on several thicknesses of soft blotting paper, to compensate for inaccuracy in cutting the tin. Another piece of paper should be placed over the space which is to contain the field of stars, and the stripes are then drawn directly over this piece, and over the striped portion of the flag.



The Stripes in the Flag are Drawn with a Special Ruling Pen Made of Tin, and the Stars are Made by Stenciling

For making the stars, a stencil is required; the stars should be cut in a piece of strong paper of the proper size. If a ticket punch made to punch five-pointed stars is available, the job can be done very quickly, and stencils of various sizes and with different forms of "wave" can be readily produced. Otherwise, some careful work with a pocketknife will be required. Having made the stencil, lay it in place on the flag, and rub over it with a lump of paraffin, such as is used in canning fruit. The paraffin works best when warmed very slightly; if the job is well done, each star will be clearly "printed" in paraffin on the paper. Now dip a paintbrush in blue ink, and paint over the whole field of stars. When the ink has become entirely dry, scrape off the paraffin with a sharp knife, bearing very gently in order not to scratch the ink, and the star field is finished. A flagstaff is easily added with a pen or pencil and ruler.

Another method of making the stars is by the use of white ink on a brush, working with the stencil, on a field which has been colored solid blue. A white ink of good quality, preferably the kind sold in solid form, will be required in order to obtain the best success in making the stars with this method.

Unless star stencils are made which suggest waves in the flag, the waves in the rest of the flag will of course have to be almost entirely confined to the portion having the full 13 stripes. If the ruling pen is tastefully used, however, this limitation will be scarcely noticeable.

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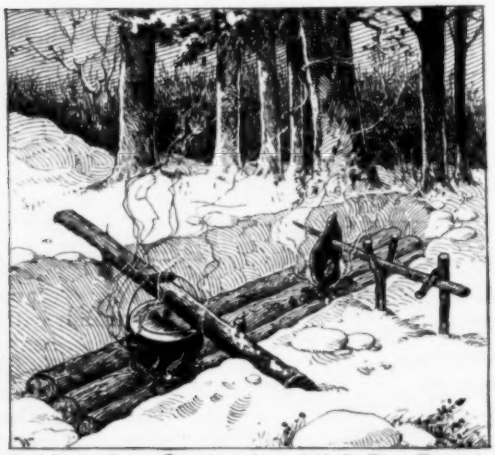
## Holding a Hand Camera at Eye Level

It is a common complaint against hand-camera work that, in so many cases, the viewpoint is too low, the lens being at about waist level. Hence, all sorts of trouble—patches of sky coming down into the picture, heads coinciding with the sky line, and so on. Many hand cameras cannot be used at eye level without some alteration, owing to the position of the finder. But it is often possible to fix a little cap over the finder, containing a scrap of looking-glass at an angle of 45°, so that, on looking along the top of the camera, the view in the finder can be seen reflected in the mirror. The device should be removable, to permit ordinary use of the camera, and the hood may be prolonged for, say, an inch behind the finder. This cuts off a great deal of extraneous light, so that the image can be seen clearly.

### How to Build a Camp Fire in Deep Snow

The illustration shows a quick and efficient way to make a fireplace in the snow,

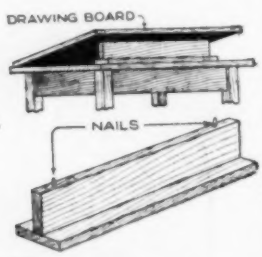


Building a Camp Fire in a Snowdrift Is Easy Enough if One Knows How to Do It. The Long Sticks Keep the Fire from Sinking

that is more convenient in some ways than a camp fire on the ground. First a trench, 5 ft. long and 16 in. wide, is made by scooping up the snow, with snowshoe or shovel. The bottom can be secured against sinking when the snow melts by laying green poles, 10 ft. long, lengthwise in the trench. A stick extends across the trench, upon which the kettle hangs for boiling. A stick supported on two others thrust into the snow will support meat, corn, etc., for broiling over the fire. If possible, the trench in the snow should be made along the side of a cabin, fence, row of trees, or other object, for breaking the wind.—F. E. Brimmer, Dalton, N. Y.

### Simple Support Adjusts Drawing Board on Table

Piling books, or other articles, under a drawing board on a table is, at best, an unsatisfactory method of holding it at the angle desired. Ten minutes' work applied to two sticks of wood will make the support shown in the sketch. Two pieces are nailed together, two nails driven in the vertical one, and the heads of these nails cut off; the nails are then filed to a very sharp point, so as to keep the drawing board from slipping. The angle at which the board rests can be varied by shifting the support backward and forward underneath it.—James E. Noble, Portsmouth, Ontario, Can.




### Getting Fresh Air into a Stateroom

When riding in a hot, stuffy stateroom on a boat, the porthole of which does not admit much air, attach to the hinge of the porthole door, by means of a piece of string, a card or folded newspaper, so that it will deflect into the window the current of air formed by the ship's motion. A considerable "breeze" may be produced in this way.—Benjamin La Pish, South Bethlehem, Pa.

### Small Washboard for Handkerchiefs Made of Spools

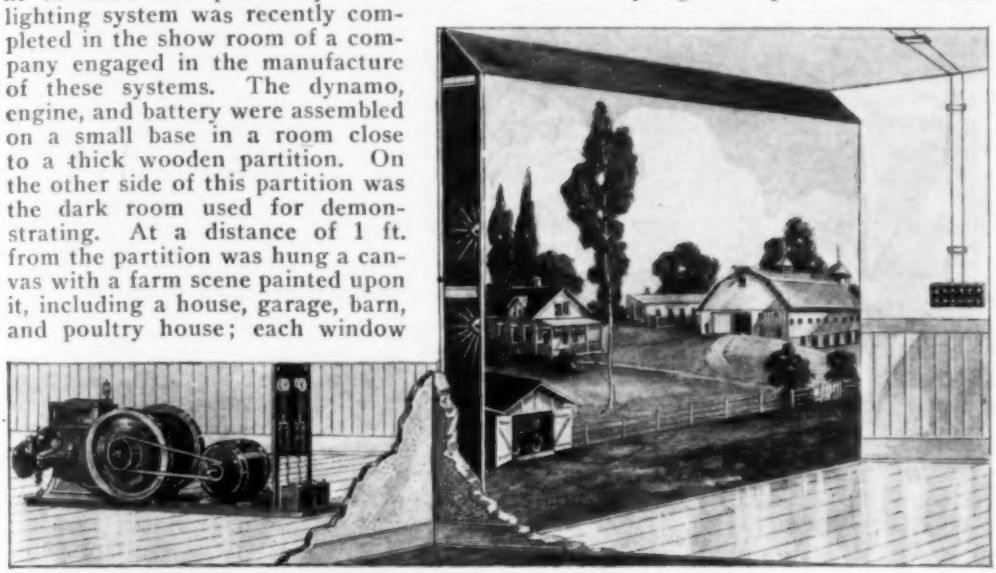
A small washboard suitable for washing handkerchiefs, or small pieces of lace or ribbon, is made by mounting a number of spools of the same size, on stiff steel wire or rods, in a suitable wooden frame. The spools on which silk thread is wound, having small flanges, are more suitable than those used for cotton thread. In laying out the frame, care must be taken that plenty of room is left for the expansion of the wooden spools, which occurs when they become soaked with water; otherwise, they will not work freely. This form of washboard will be found to entail a less amount of wear than the ordinary one, which involves rubbing against a rough surface.—A. S. Thomas, Amherstburg, Ontario, Can.

### Screen and Storm-Door Hooks

To prevent furrows and holes in screen and storm doors caused by battering with the screw hooks, put the hook on the jamb and the eye on the door. Then the screw hook can do no damage. This will prevent the marring of the casing, which is due to the hook swinging outward as the door is closing. The changed position will not be found inconvenient.—W. J. Parks, LaSalle, Ill.

### Electrical Model Shows Possibilities of Farm-Lighting Plant

A neat and effective demonstrating outfit to show the possibility of a farm-lighting system was recently completed in the show room of a company engaged in the manufacture of these systems. The dynamo, engine, and battery were assembled on a small base in a room close to a thick wooden partition. On the other side of this partition was the dark room used for demonstrating. At a distance of 1 ft. from the partition was hung a canvas with a farm scene painted upon it, including a house, garage, barn, and poultry house; each window was in reality a hole in the canvas, covered with thin tissue paper, behind which the light from a certain lamp could be seen. There were in all six lighting circuits, each one to illuminate a certain object in the picture; corresponding to these, there were six switches in a handy board, within reach of the salesman, as he stood in front of the canvas. The manner in which the different objects were successively lighted up as the salesman emphasized the particular advantages of lighting in this particular spot, formed a vivid impression in the minds of the listeners, and may furnish a valuable suggestion to salesmen with similar problems. —H. S. Rich, Cromwell, Conn.



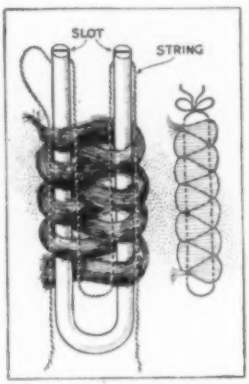
**Demonstrating a Farm-Lighting Outfit: The Painted Windows Are All Transparent, with Lights behind the Canvas, So That the Salesman, by Touching a Button, can Illuminate Any of the Windows Visible in the Picture**

### Changing Blueprints to Imitation of Sepia

By washing blueprints in a solution of one part tannic acid to 10 parts of distilled water, they are changed to a beautiful imitation-sepia tone which is permanent.

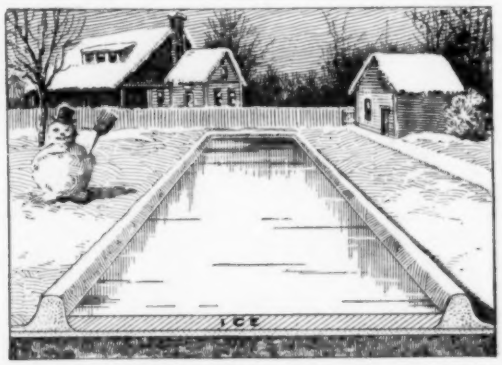
### Wireless Hair Crimper or Waver

This instrument may be made of wood or metal in the shape of an elongated "U," with the two ends slit as shown. Ordinary twine is passed through the slits, a loop being made long enough to be held in the hand with the crimper, as well as the two ends of the string. The strand of hair is carried first around one end and then another in figure-eight fashion. Then the two free ends of string are drawn through the hair and removed from the slits, and the free ends tied in a bow knot. The crimper is then removed. The feature of this method is that there is no metal remaining in the hair, and only the soft tufts of hair to lie upon instead of metal. Moistening the hair slightly before curling will make the curl or wave remain in for a longer time after the string is removed and the hair combed out. There are no future fittings to buy, as the strings necessary are always to be had in the home. Ribbon may be substituted for string, if preferred.—Harry E. Gifford, Medford, Mass.



### Making a Skating Rink in the Back Yard

In making a rink of this kind, the first thing necessary is to have the ground well frozen, and plenty of snow covering




**It Is Not Difficult to Make a Good Skating Rink in the Back Yard, if the Directions are Followed Carefully, and the Weather Is Not Too Warm**

it. With scrapers or shovels, scrape all the snow off the area to be iced, piling it up in good-sized banks all around the space, to a height of 15 in. or 2 ft., finishing off with an old broom. The bases of the snow banks should be about 18 in. through, gradually tapering toward the top. Before packing, throw enough water on them to make the snow very moist. Then pat it well down with shovels or boards, and let it freeze. The first cold night will so firmly set the banks that they will be more like ice than snow. In the same manner, wet down the scraped "floor" of the rink, and let this also freeze well. If most of the water seems to be absorbed the following morning, and little ice shows, wet the ground thoroughly again and again.

Some cold day which promises a hard-freezing night, flood the basin with water; this can be done most handily with a hose, but if none is at hand, a number of boys with pails can soon accomplish the object. Cover the ground with water to a depth of about 6 in. After a few nights and days of cold weather, the rink will be covered with ice of sufficient thickness for good skating, and then all that is necessary is to keep it in as good condition as possible. Scrape off and sweep off all light snows that may fall, and if a thaw comes, or the surface becomes too badly cut, flood the rink again, bringing the water line above the slush or rough spots, so that the first freezing weather will give you a new and smooth surface of ice.—J. G. Allshouse, Vandergrift, Pa.

### Mount the Clothes Basket on Wheels

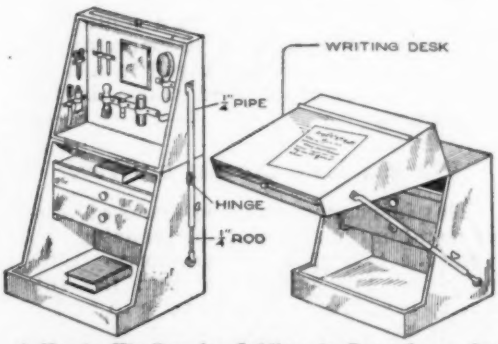
Mounting the clothes basket on a wooden frame provided with small wheels, lightens considerably the labor of wash day. The basket and table may be painted with white enamel to make them easy to keep clean, and the basket can be filled with a much heavier load than would be practicable if it were to be carried. It can then be rolled out to the clothesline, so that the clothes can be lifted directly from it and hung on the line.—Edna Goodman, Glencoe, Okla.

### Metal Mirrors for Cyclists

Riders of bicycles and motorcycles have found that metal mirrors, originally intended for soldiers' use, give excellent service as mirrors for observing the street to the rear. They are easily attached to the handlebars of the machine, in the same manner as the now common glass mirror used for the same purpose. While the mirror may also be used on automobiles, bicyclists have found it of especial value, in that it is not subject to breakage, despite the frequent spills that often prove disastrous to the glass mirrors.—J. R. Elliott, Rochester, N. Y.

### Kit Box and Writing Desk for Soldiers and Campers

After losing a lot of time hunting around in a kit bag every time an article was wanted, a handy kit box, as shown in the sketches, was designed and made by a soldier for use in his permanent bar-




**A Handy Kit Box for Soldiers in Barracks or for Campers: It is Easily Converted into a Novel Writing Desk, by Adjusting the Length of the Braces**

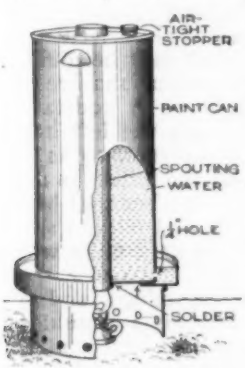
racks. When closed, the box measures 12 in. deep by 14 in. wide by 28 in. high, which corresponds with local camp regu-

lations. Opened up to its full height, it becomes a very handy dresser, with toilet articles conveniently arranged in elastic loops about a mirror. Below are a shelf, two drawers, and a handy catch-all space. When the top is lowered to the halfway position, the box becomes a writing desk, with writing material conveniently held in the double top.

The two folding braces are made of a peculiar form to permit this. Each consists of two pieces of ¼-in. pipe, hinged together, with a piece of ¼-in. rod projecting into the lower one. The hinge comes into use only when it is desired to close the box entirely.—Pvt. C. M. Vaiden, Edgewood, Md.

### Nonfreezing Poultry Fountain

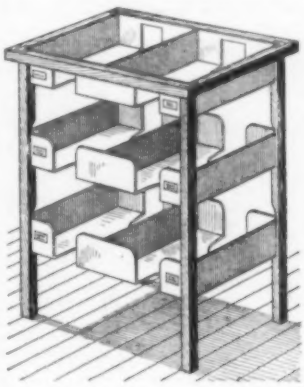
In my poultry yard I am using a homemade nonfreezing drinking fountain, which supplies water for the chickens on the coldest days. The method of its construction is as follows: In the top and bottom of a 5-gal. paint can, cut holes, 3 in. in diameter, and solder in a piece of galvanized-iron rain-water spouting. About 1 in. from the bottom of the paint can, drill a ¼-in. hole. The drinking pan, 15½ in. in diameter and 1½ in. deep, may be made or purchased. Cut a circular hole in the bottom of it, a little smaller than the diameter of the can, and solder the pan to the bottom of the can. The lower pan is 13 in. in diameter, 6 in. high, and has no top. Bore several holes, ½ in. in diameter, around this, near the bottom, to admit air. Place a cheap kerosene lamp in the center of the lower pan, and set the can and drinking pan on top of this, getting the flue in the center.




Remove the stopper at the top of the can, and cork the ½-in. hole. Fill the can full of water, and replace the stopper tightly; then remove the cork from the ¼-in. hole. This allows about 1 in. of water to flow into the drinking pan. On cold days the lamp is kept lighted, and the water will not freeze as with an ordinary fountain.—R. S. Matzen, Fort Collins, Colorado.

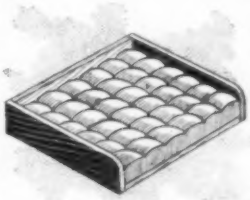
### Rack for Office Papers Makes for Neatness

The manager of an office became tired of having his table and desk covered with various baskets for papers, which were to be delivered by a messenger to various persons designated on the baskets. He then designed and ordered made the rack shown in the illustration. It has six compartments, in which the manager places papers destined for six different assistants, or departments. The end holes make it easy to put in and take out papers from these compartments, which are labeled at both ends. One end is within arm's reach of the manager's chair; from the other end, the messenger lifts the papers and distributes them, as directed by means of the labels on the compartments.—Fred C. Gallagher, Augusta, Ga.



### Cushion for Knees Gives Comfort While Scrubbing

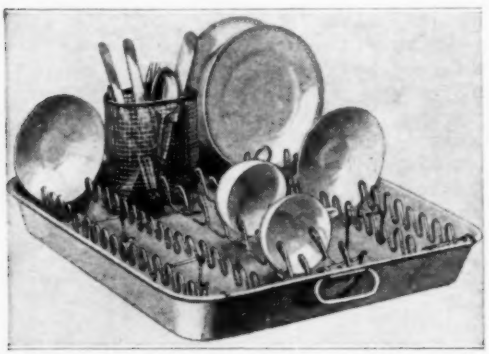
Housewives have always found scrubbing their most dreaded task. It is hard and tiresome, inasmuch as it is often painful to kneel for any length of time. It's a messy job as well, as water will splash on the clothing. The scrubbing box shown in the sketch affords a cushion to kneel on, and keeps the waste water from splashing on the clothing. The box can be made from an ordinary soap box cut in two longitudinally. The cushion can be padded with an old sofa pillow, or excelsior or straw, covered with burlap.—R. O. Helwig, Chicago, Illinois.



¶Aluminum is a more rapid conductor of heat than cast iron, and great care in preheating it for welding is necessary.

## Dish Drier Made of Racks in a Biscuit Pan

Drying the dishes after washing, with a towel, is one of the ancient customs largely discredited by modern sanitation.



**The Dishes are Drained by Setting Them on a Rack Made of No. 12 or 14 Gauge Steel Wire, Bent to Fit the Edges of the Dishes and Mounted in a Biscuit Pan**

Even if the towel is clean, it is a waste of time, as the dishes will be cleaner if thoroughly rinsed off with boiling water and left to dry. The dish drainer for this purpose, shown in the photograph, was made by bending stiff wire over nails in a vise, and soldering them together to form a shape which fits into an ordinary bread or biscuit pan. A compartment for silverware is also shown, which was made of wire net. It will be noted that wire supports are provided, which hold the rack for the dishes some distance above the bottom of the pan, so as to leave space for any water which may fall from the dishes. If this space is made an inch or more deep, the dishes can be rinsed by a stream of hot water from a small rubber hose.—S. R. Winters, Washington, D. C.

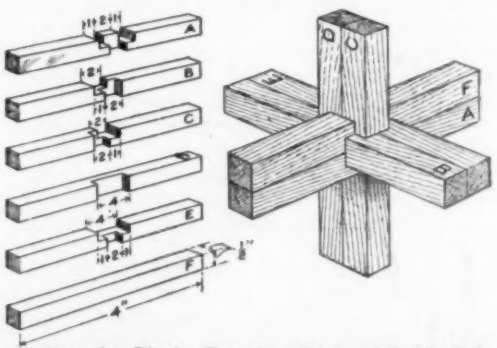
## A Wooden-Block Puzzle

An interesting and somewhat baffling puzzle is to put together six wooden blocks, cut to the shapes detailed at the left of the illustration, so as to form the cross shown at the right. It can be done in half a minute after one has learned how, but one might easily spend an hour or more in trying if the method is not known.

The six pieces are blocks of some hard wood, all cut at first to the size of ½ in. square, and about 4 in. long. The ½-in. dimensions, on all the pieces, must be quite accurate, if the puzzle is to work well. Slots are then cut in all but one of the blocks, there being one slot in block D, two intersecting slots in blocks B, C, and E, and three slots in block A. The depth of all slots is ¼ in., or half the thickness of the block. Their width is either 1, 2, 3, or 4 times the depth (¼ to 1 in.), as shown in the dimensions in the details. The slots should of course be smoothed up nicely and made just slightly larger than the dimensions given, so that the blocks will fit into them.

While learning to put the blocks together, it will be helpful to place on each the letter distinguishing it, being careful to place it in exactly the same position on the block as shown. Then assemble the blocks so that the letters come at the positions shown at the right, starting with block A, fitting B into it, then fitting C into its place, and so on until block F is slid into place, locking the cross together until it is removed. Even with these directions, the task may be difficult unless the following precautions are observed: First, hold block A constantly in the same position, with the left hand, until the last block is inserted, so as not to alter the position of the letter, as seen by the eye. Second, remember that block F goes directly over A, and has no slots, so that its path must be kept clear while assembling.

After the device is assembled, and the method is familiar, the ends should be sawed off even, so that each end is at the same distance from the nearest crossing block. Since this is not always the same as the distance to the nearest slot, the ends should be finished off while assembled. The figures are then erased from the blocks, and the puzzle is ready for placing before the novice.




**To Put the Blocks Together, Begin with Block A, and Place Each So That the Letter Comes into the Position Shown**

The effectiveness of the puzzle depends

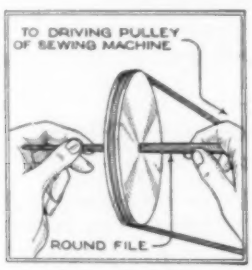
largely on the fact that one may exhibit the structure all assembled, pull it to pieces with two quick motions (removing F and E) and defy anyone to put it back together again.—Tod Masters, Ft. Atkinson, Wis.

### Rubber Tube Holds Screw on Screwdriver

To start screws in inaccessible places, slip one end of a piece of rubber tubing, such as is used for gas lighting, over the end of the screwdriver, and the other end over the head of the screw. The tubing will keep the screwdriver in the slot of the screw while starting it. If a rubber tube is not at hand, a piece of paper may be rolled to a conical shape, and will do nearly as well.—James L. Brown, Seattle, Washington.

### Reaming a Pulley Hole with a File

A pulley with a ¼-in. hole was to be placed on a shaft which was 5/16 in. in diameter. No reamer was handy, and filing out the hole in the usual way would have been quite a job. It was done, however, by slipping the pulley on the handle of the file, and connecting the pulley by a sewing - machine belt to a driving wheel of the machine. The ends of the file were then held in the hands, while the pulley was revolved by the belt. If carefully done, the hole will be found fairly true, and can be trued up slightly by hand afterward, if found necessary. Oil should be used on the file, if it begins to feel hot to the fingers.—E. Standiford, Youngstown, Ohio.

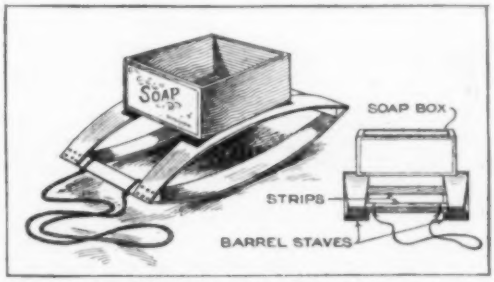



### Doors Often Carelessly Misplaced in Small Buildings

Many a farmer and carpenter, when building a shed, coal house, or other outbuilding, fails to consider, in locating the door, whether it is in the right place for rainy weather. If the door is placed under the eaves, rain drips constantly in front of the door, and entering it is far from a dry process. If the door is placed under the gable, this annoyance does not occur. —T. J. Hubbard, Mendota, Ill.

### Inexpensive Sled Made from Old Barrel Staves

This sled can be made by anyone who can handle a hammer. The materials needed are four barrel staves, two strips of triangular section, and a soap box. The staves, which give the sled a springy motion, are nailed as shown in the sketch, with the strips fitted snugly in the ends. This gives it strength, and provides a place for attaching a rope. The box is then nailed on, forming a sled that will go over bumps like an auto. The sled can be used either for pulling along level ground or for coasting.—Nelson Burns, Buffalo, N. Y.




**A Soap Box Mounted on Four Barrel Staves Forms a Sled Which Contributes toward Relief from the High Cost of Toys**

### How to Make Raised-Letter Show Cards

A simple method of making raised letters on signs and show cards, which is perhaps well known to most artists in this line, but might be of interest to a large number of amateurs, involves the use of a rubber bulb, to which are fitted a number of spouts of different shapes. The letters are made by pressing through one of these spouts a ribbon of some suitable substance, following the lines which have been laid out as a pattern for the letters desired. The paint or paste can be made of whiting, dissolved in mucilage, thick glue, or a solution of gum arabic. Pigments can be added to color the paste any shade, and if work is to be done in several colors, a bulb can be filled with material of each color, the spouts being interchangeable on any of them.

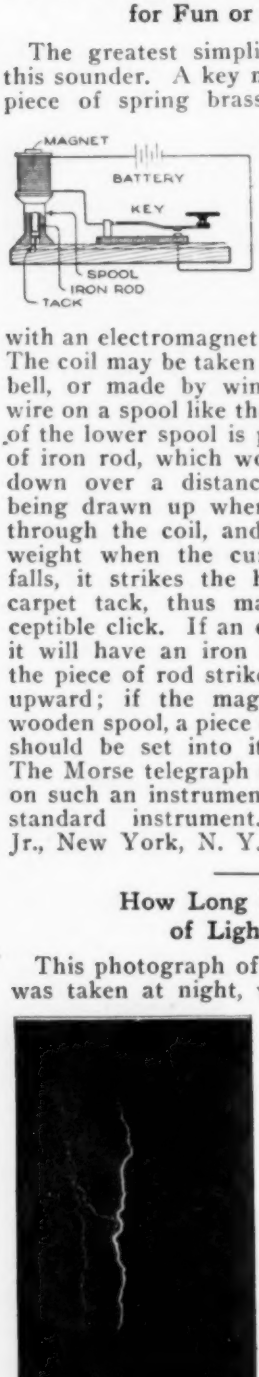
### A Very Simple Telegraph Instrument for Fun or Practice

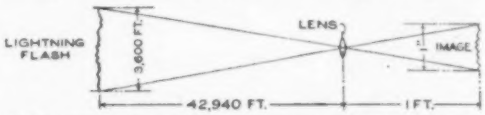
The greatest simplicity is attained by this sounder. A key may be made of any piece of spring brass pressed down to contact on the head of a tack, or a manufactured key can be mounted, if one is available. The sounder itself consists of a wooden spool with an electromagnet coil set on top of it. The coil may be taken from an old electric bell, or made by winding fine insulated wire on a spool like the lower one. Inside of the lower spool is placed a short piece of iron rod, which works loosely up and down over a distance of about ¼ in., being drawn up when the current flows through the coil, and falling of its own weight when the current stops. As it falls, it strikes the head of a common carpet tack, thus making quite a perceptible click. If an old bell coil is used, it will have an iron core against which the piece of rod strikes when it is drawn upward; if the magnet is made on a wooden spool, a piece of iron rod or screw should be set into it to act as a core. The Morse telegraph code can be learned on such an instrument as well as on any standard instrument.—Wm. Warnecke, Jr., New York, N. Y.




### How Long Is a Flash of Lightning?

This photograph of a flash of lightning was taken at night, with a thin double-convex lens of 12-in. focal length. The sound of the thunder accompanying the bolt reached the photographer 38 seconds after the flash was observed. The temperature at the time was 72°, and in still air at this temperature the speed of sound is 1,130 ft. per second. As there was no appreciable wind, the bolt was thus about 38 times 1,130, or 42,940 ft., distant. As will be seen in the diagram, the rays of light coming from the extreme ends of the flash form two similar triangles. The image on the photographic plate was at a distance of 1 ft. from the lens. Careful measurement on the original negative showed that the image of the flash was 1 in. in length, or one-twelfth of a foot. Since the large triangle is of the same shape, its base will also be one-twelfth of its height, and the length of the flash is thus shown to be one-twelfth of 42,940 ft., or about 3,600 ft.—over two-thirds of a mile. If the flash is not parallel with the camera plate, it is even longer than this. Further, the actual ends of the discharge may not be visible, so that the computed value is quite conservative. One may give his imagination full play in contemplating the voltage necessary to produce a spark discharge across a 3,600-ft. gap.—L. Pyle, St. Louis, Mo.






**With Proportions Much Exaggerated, the Diagram Shows the Relations by Which the Length of the Flash is Calculated**

### Can Opener Made into a Needle for Coarse Sewing

Many cans used for packing meat, and other food products, are opened by means of a small handle or key, which has an eye for receiving a strip of tin and winding it up. These keys are always furnished with the can, and usually thrown away as the can is opened. Should a large needle for sewing blankets or burlap be required, a splendid one may be made by straightening out one of these keys and filing the end down to a point.—W. W. Snyder, Cleveland, Ohio.

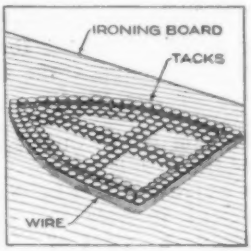
### Enabling Automobile Driver to Signal Comfortably in Winter

In spite of the hundreds of mechanical signaling devices invented and advertised for automobiles, the old method of thrusting out the driver's hand at the side of the car, whenever a turn or stop is to be made, still remains the favorite. This is, however, very inconvenient when the side curtains are in place, as the curtain must be left open for the purpose, thus letting in cold air or rain. One driver cut a slit in his side curtain, large enough for

his hand to go through, and sewed the edges with heavy thread like a buttonhole. It was found that very little wind or rain came in through the slit, and signaling was easy in the ordinary way. This method of signaling, while crude, has the great advantage of not depending on mechanism which may get out of order.

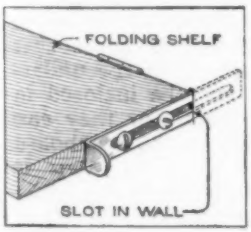
### Tacks Driven into Ironing Board Form Iron Rest

An iron rest which will never get lost or separated from the ironing board consists merely of a large number of tacks, driven into one end of the board. The tacks should not be driven clear in, but should project about ⅛ in., so as to allow an air space below which will prevent a hot iron from burning the board. A row of tacks around the edge can be left projecting a little farther than the others, and will then keep the iron from slipping off. If trouble is experienced by clothes tearing on the tacks, wind some wire around under the heads of the outer row of tacks, as shown in the illustration.



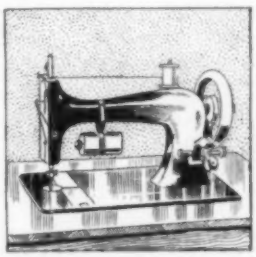

### Folding Shelf Supported by Sliding Bar

By means of a metal slide, which fits in a slot cut into the wall, a shelf may be firmly supported without brackets below it, and may be quickly folded up on hinges to get it out of the way. The slotted piece on the end slides on two screws; when pulled out from the slot in the wall, the shelf is folded upward and the slide dropped down to prevent the shelf from falling. The slot in the wall is readily made by drilling several holes in line, and cutting out the wood between them with a chisel. The metal slides should be of exactly the same width as the thickness of the shelf, so as to hold it nicely when folded up.—Elmer O. Tetzlaff, Cicero, Ill.



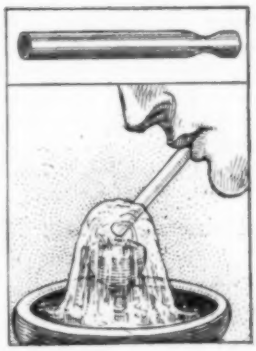

### Light for Threading Sewing-Machine Needles

Threading the needles of a sewing machine is a job which requires a good light. A light strong enough to furnish the proper illumination for this purpose might be too expensive, and too brilliant for constant use. A good way for anyone who does a great deal of work on a sewing machine is to attach a flash light by a good-sized rubber band, slipping the band over the end of the machine, and tying it so as to hold the flash light in a small loop at its lower end. When a needle has to be threaded, the flash light can be pulled down so as to illuminate the exact position desired, and as soon as the needle is threaded, it will be pulled back and be out of the way.—L. A. Collins, Louisville, Ky.



### Drinking Tube for Use at Bubbler Fountains or Springs

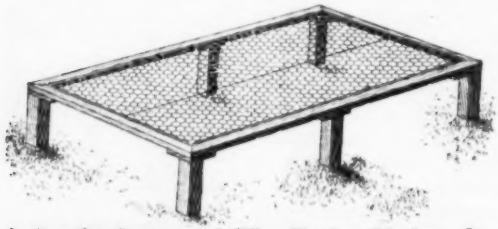
Many persons object to drinking from the bubbler fountains which are now installed in many public places. Some of these may find that a tube, such as the one illustrated, makes the use of the fountains less objectionable. The tube is bent in slightly near one end, to fit the teeth, so that it will not slip from the mouth. Unless made of aluminum tubing, it should be plated with nickel or silver. It should, of course, be kept clean by being wrapped in a paper or placed in a clean case.—H. F. Griswold, Indianapolis, Ind.



¶Hard putty can be made as good as new by simply putting it through a common household-size food or meat grinder, using a fine cutter, and then mixing it with the proper proportion of oil to make it pliable.

### Wire-Netting Platform Useful in the Back Yard

A platform built in a back yard, consisting of wire netting, mounted on a frame of 2 by 6-in. planks, and resting

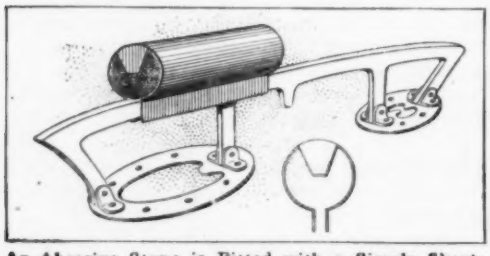


A Stoutly Constructed Wire-Netting Platform Is Useful for Drying Anything from a Blanket to a Lot of Vegetables, Besides Simplifying the Job of Carpet Beating

on six 4 by 4-in. legs, was found useful for a variety of purposes. For beating large rugs, the advantage over hanging them vertically will be appreciated by any boy who has ever been given the task of carpet beating. Lace curtains can be stretched and dried on the platform, with no extra apparatus except a few pins, as the platform is set in a sunny part of the yard. Blankets, sweaters, and other articles which are very heavy after washing, may be dried by simply laying them on the netting, and this avoids the tendency which such articles have to stretch and become distorted, when hung on a line. For drying fruit and vegetables, the platform also comes in handy, although one must look out for rain, unless a cover is provided. To complete the list of uses, such a structure has been used temporarily by fastening another strip of netting around the sides to confine some young chickens.—C. J. Brickett, Scranton, Pa.

### Homemade Skate Sharpener Produces a Concave Edge

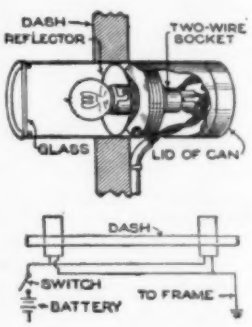
This tool is constructed from a cylindrical emery or carborundum stone, about 3 or 4 in. long, and ¾ to 1 in. in diameter. Around the stone is placed a piece of sheet brass or iron, held from slipping off endways by lugs bent over the ends of the stone. The edges of this metal cover are bent up so that the skate blade just fits between them. By running the tool back and forth, with considerable pressure and plenty of water to keep the stone from getting clogged, the skate will be sharpened with a form of edge which will reduce considerably the possibility of slipping while skating.—W. F. Saunders, Boston, Mass.



An Abrasive Stone is Fitted with a Simple Sheet-Metal Guide Which Makes Skate Sharpening Easy, and Gives a Concave Bottom Surface

### Side Lights for Automobiles

Very useful as well as neat-appearing electric side lights for an old automobile can be made from two small tin cans, 1½ to 2½ in. in diameter. The bottom is cut out of the can, leaving a narrow rim sufficient to hold in place a circular piece of window glass, which can be cut out with a glass cutter, or can be obtained from any hardware or automobile-supply store. The glass is held from slipping backward by a washer of rubber, fiber, or stiff pasteboard. A standard two-wire socket is mounted in a washer consisting of several thicknesses of pasteboard or thin fiber, cut to fit the can. The reflector is formed from tin, cut from another tin can; its edges should be soldered together, and may be soldered to the metal socket. The wires leading to the socket are carried through a hole in the underside of the can, and may be inclosed in conduit or "circular loom," or they can be fastened quite neatly to the dashboard with insulated staples. The lamp is mounted in a large hole cut in the dash; if the car has a sloping cowl of sheet metal, the hole will, of course, be extended also through this. To renew the bulb, or clean the reflector or glass, it is only necessary to remove the lid of the can at the rear and pull out the socket. To make this possible, some extra length of cord must be left in the back of the lamp, and a notch must be cut in the washer which holds the socket.

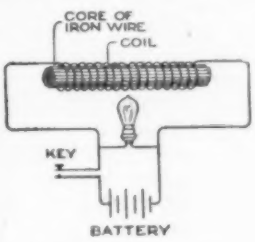



The lamp may, of course, be wired up

in any way preferred, depending on the kind and voltage of the battery used. Bulbs of suitable size are readily obtainable, for three or six volts. The diagram shows the ordinary wiring placing the two lamps in parallel. A tail lamp similarly constructed can also be made.

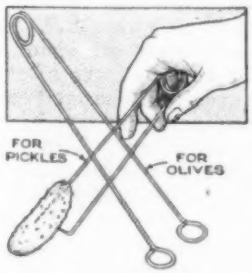
### Simple Apparatus Demonstrates Electrical Induction

The presence of the momentary induced current, when a steady current is interrupted, is shown very clearly by means of the arrangement shown in the accompanying figure. A coil, which consists of a large number of turns of insulated wire, is wound around an iron core, and is connected in circuit with a make-and-break key and a battery of cells. An incandescent lamp is also connected in parallel with the coil; it should be a lamp designed for a voltage considerably higher than that of the battery. Although the battery may not be of sufficiently high voltage to cause the lamp to glow when the current is passing through the circuit, yet, when the key is opened, the induced electromotive force, due to the self-induction of the coil, will be so great that sufficient current will flow through the coil and the lamp circuit to cause the lamp to glow brightly for an instant.—Peter J. M. Clute, Schenectady, N. Y.



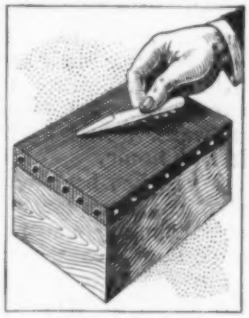

### Forks for Removing Pickles or Olives from Bottle

The simple wire tools shown will be found very useful in removing pickles and olives from tall bottles. The method of using them is evident from the drawing. They may be made slightly more convenient to use, if found desirable, by soldering small pieces of sheet brass at the places where the fingers grasp the wire. The forks should be heavily plated with nickel, or preferably silver.



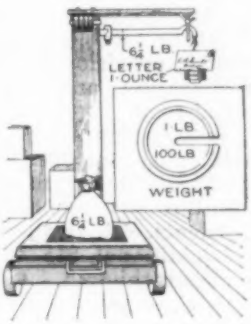

### How to Sharpen Chalk Quickly to a Chisel Edge

Artists, sign writers, and shop men, who use chalk sharpened to a chisel edge in order to make fine lines, know how difficult it is to sharpen the chalk in this way with a knife. It is also difficult on sandpaper, because this immediately becomes filled with chalk and ceases to cut. The best thing for grinding off chalk is screen wire. If a piece of this material is tacked tightly over a small box, it is very handy for sharpening the chalk, and the box catches the chalk dust, preventing it from escaping into the air.



### Weighing a Letter on a Heavy Platform Scale

"I wish I knew whether that letter weighed more than one ounce," said a grocer's clerk. "You have a scale, why don't you weigh it?" replied a traveling man in the store. "Can't do it on that scale because the finest graduations on the beam are ¼ lb. each." The stranger picked up one of the weights which hang from the top of the beam. "See the figures on that weight, 1 lb. = 100? That means that 1 lb. placed on the counterpoise equals 100 lb. on the platform of the scale, or, in other words, 1 oz. will exactly balance 100 oz. on the scale platform. Now 100 oz. are equal to 6¼ lb. Weigh out 6¼ lb. of anything you please and leave it on the scale platform. Run the poise back to zero and place your letter at the end of the scale beam; if the beam rises the letter is less than 1 oz.; if it goes down it is overweight."—W. H. Sargent, Rutland, Vt.




¶ A Bunsen burner, lighted under the grate, will start a fire quickly.

# GOVERNMENT INSURANCE HELPS YANKEE TROOPS DEFEAT HUN

SOME time ago it was said that more than 90 per cent of our soldiers had availed themselves of government insurance. At that time the average fighting man's policy was written for $8,000. Never before in the world's history have armies, so protected as America's, taken to the field. Our fighting men now realize that should they fall, grief, but not the misery of want, would be the heritage of those left at home.

Much has been written about the war-risk insurance law. It is doubtful, however, if many men in the 18-45 draft fully understand to what extent the government offers to protect their interests in the event of their call to arms. Therefore a brief summary of some of the provisions that have been made may not be amiss at this time.

There are in reality four separate, but correlated, acts in force. The first deals with a system of "allotments and allowances," by which the government and the fighting man share responsibility for the care of dependents. The second bill involves the payment by the government of compensation in the event a soldier is killed or disabled in line of duty. The third measure is government insurance, to the maximum extent of $10,000, against death or total, permanent disability. The fourth provision involves a program of reëducation and rehabilitation of disabled men.

In accordance with the first measure, a soldier is compelled to allot a minimum of $15, but not more than half, of his monthly pay for the support of his dependents. In turn, the government pays an additional $15 to a dependent wife without children. If there is a wife and one child, the government pays $25; a wife and two children, $32.50, with $5 monthly for each additional child. When there is one child, but no wife, the government allows $5; for two children, $12.50, and for three children, $20. Other allowances are made when the dependents are parents, brothers, sisters, etc. The government's maximum liability in the matter of family allowances is $50, added to which, of course, is the soldier's compulsory allotment.

In the event of a soldier's death, monthly compensation is paid dependents. A widow with no child receives $25; if there is one child, the payment is $35; two children, $42.50. An orphan receives $20, two orphans $30, three $40. Other allowances are made for dependent parents.

Under the provisions of this same measure, a disabled soldier without dependents receives a monthly allowance of $30. If there is a wife, $45 is paid. In the event of there also being a child, $55 is awarded; two children $65, and three children $75. In addition he receives government medical, surgical, and hospital services, including artificial limbs and other appliances if needed.

The insurance act was passed in order that protection in addition to that already explained, might be afforded every person, man or woman, engaged in recognized war service. By its provisions a soldier is able to take out from $1,000 to $10,000 insurance at less than ordinary rates. Each $1,000 of insurance is payable in monthly installments of $5.75 for 240 months. Thus, in the event of the death or disability of the average soldier, who has $8,000 of insurance, the monthly payment from this source would amount to $46. Were the man disabled, married, and the father of two children, for instance, his total monthly allowance from the government would thus be $111. From this it must be evident that no disabled soldier nor his family ever need be in want. A further safeguard has also been made. Should, for example, a disabled soldier live longer than 240 months, the payments would be continued as long as he lived and was so disabled; or as long as his dependents survived.

The cost of government insurance is remarkably reasonable. A soldier 26 years old pays $80.40 per annum for a $10,000 policy, which, obtained from a private insurance company, would cost him $580.

There is another important provision. The insurance may be kept in force after the expiration of the war and changed to ordinary forms, including ordinary life, 20-payment life, and endowment. The insurance will remain government insurance and be nonsubject to attachment by creditors.

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# NEW STRETCHER DIVIDES IN HALF LENGTHWISE

Withdrawing the Halves of the Stretcher from Under the Patient, after having Removed the Locking Rods

The Upper Stretcher has been Divided in Half by Removing the Rods, While the Rods Are in Place in the Lower Stretcher, Interlocking the Loops Forming the Edges of the Canvas Halves

Patient About to be Lifted from an Operating Table on the New Patented Stretcher, Made with Detachable Halves

The special feature of a recently patented stretcher, designed to permit the delivery of a patient to a bed with the minimum of discomfort, is its division lengthwise into detachable halves. The center coupling consists of two small steel rods, each 3 ft. long, which are inserted, one at either end, through canvas loops in such a manner that the two parts of the stretcher are interlocked. The iron braces, which are provided to keep the canvas taut, can be folded into recesses in the wooden sidepieces, and the handles are hinged so that they can be folded under, reducing the length of the stretcher to 6 ft., which is less than the length of a bed. When a stretcher and patient have been placed on a bed, the rods mentioned above are removed and the halves withdrawn.

## FRONT-LINE FIRST-AID WORK BECAME AUTOMATIC ROUTINE

It is somewhat astonishing to find that some of the work of the Royal Army Medical Corps in the front-line areas was so systematized, before the close of the war, that automatic action supplanted thought. In all cases of fractures of the lower limbs and extensive wounds of the thighs, for instance, it was made a practice to secure immediate immobilization of the patient. This was done before evacuation from an advanced dressing station or even a regimental aid post. The entire procedure, involving the warming of the patient with blankets and a special stove, the attachment of the splint to a suspension bar on the stretcher, and the arrangement of hot-water bottles and blankets for the journey, was reduced in training schools to a drill in which the various movements were represented by numbers. The result was that after an operator had become thoroughly familiar with the drill, he not only could execute the work in darkness, but, with two assistants, could put up a limb in 2 minutes 45 seconds. The principle was actually taught that in applying a splint under such circumstances, thought should be unnecessary and every action absolutely automatic.

¶ Reports among ordnance circles have it that, had the war continued, the United States would have possessed a gun which could shoot 100 miles, thereby considerably surpassing the big guns with which the Germans shelled Paris.

# Killed in Action in France, October 5, 1918

LIEUTENANT BOYD was born in Toronto, Canada, in 1883: his father was one of the editors of the Toronto Globe. Upon the death of his father the family came to Chicago, where Lieutenant Boyd was educated.

LIEUTENANT GORDON BOYD

AN HONORED MEMBER OF OUR STAFF

He also spent considerable time in study and travel abroad. Returning to Chicago, he took the law course at the Northwestern Law School, but preferring newspaper work, connected with the Record-Herald. In 1909 he joined the staff of this magazine and for eight years was one of its eastern managers, being located in New York. In 1917 he took the Plattsburg course and was commissioned first lieutenant. Although not in the draft age at the time, he volunteered, and was sent overseas in January, 1918. During his training in France, his letters frequently expressed the great responsibility he felt for the men under him. He was repeatedly in action.

His sense of humor, so much enjoyed by his friends, could not be restrained even in describing one of the early engagements in which he took part, for he wrote, after giving a picture of the awful gun fire, "In fact I think I was shot at with everything known to warfare except bows and arrows."

His last letter, written September 10th, reads: "We are back in a rest area again and in a fine part of France. My billet is in the home of the mayor of the village around which the troops are stationed. It's a great treat to

be able to take one's clothes off at night. We were in the front area three weeks, and during that time had my clothes off only once, and during ten days did not even have my boots off. It's remarkable how well we all keep in spite of this sort of life, but we are as hard as nails. I was placed in command of a Lewis gun section to act as a contact patrol. On the afternoon of August 31st, with nine other patrols, we went over the top. Soon after, the other patrols went back, but we kept on, and after crossing three belts of Boche wire we ran into the Boche himself—a whole nest of dugouts. We were lucky enough to capture and bring back fourteen prisoners, after fierce resistance by the Heinies, in which some of my men were killed. The affair lasted 2½ hours. I am putting in for leave to Paris today, and if it goes through you will hear from me there. The news is very good these days; it will be a wonderful day when peace does come, won't it?"

The leave was not granted; instead he returned to the front. Beyond the official confirmation of his death no details have been received.

His was one of those genial, refined, sensitive natures, beloved by all who knew him. As he said on leaving, he deemed it a "grand and sacred privilege" to do his part. That he acquitted himself with fearless courage on the battle field before that last, fatal combat, we have abundant evidence. That he was the same undaunted soldier to the last, we know. His passing is a part of the great cost of freedom for the world, and is a personal loss to all who ever knew him.

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## TWENTY-SHOT HYPODERMIC SYRINGE IS INVENTED

Among the war inventions that probably will prove valuable in peace time is a magazine hypodermic syringe that may be used 20 times without refilling. Obviously its chief merit is that of convenience when physicians and surgeons are working under fire and in dark dugouts where continual recharging of syringes entails difficulty and retards operations. The instrument is supplied with a platinum needle which permits sterilization in a flame. The cap that protects it, when not in use, is kept filled with iodine or alcohol. When large numbers of persons are being inoculated with typhoid serum, for instance, an instrument such as the magazine syringe evidently saves much time.

## CHICAGO SEEN AS IRON CENTER BY INDUSTRIAL EXPERT

According to an analysis made by a professor of industry at the University of Pennsylvania, the Chicago district is destined to supersede Pittsburgh as the iron and steel center in America. Several important factors, he points out, are contributing to the gradual decline of the latter's supremacy. Among them are the facts that Chicago is now virtually the center of population, one of the greatest railway centers in the world, an important lake port, and the site of many of the nation's largest iron-using industrial plants. The main trade routes no longer pass through Pittsburgh; by-product coal made from soft coal has begun to replace Connellsville coke, wastefully manufactured, and low freight rates for west-bound coal and coke, shipped in ore cars that otherwise would be empty, are factors that conspire to work to the disadvantage of Pittsburgh. In summing up the situation, he calls attention to the well-known and significant fact that the world's largest steel mill is situated at Gary, Ind., within an hour's ride of Chicago's business center, which adds considerable strength to his argument.

## RIVETLESS BARGE IS BUILT IN GREAT BRITAIN

There has been much discussion of late about the feasibility of building electrically welded steamships and thereby avoiding the time and expense consumed in riveting. From England comes word of the completion of a rivetless 275-ton barge, supposedly the largest electrically welded craft so far produced. It is 125 ft. over all, and 16 ft. of beam. The hull is rectangular in section amidships—only the bilge plates being curved. All watertight joints as far up as the latter are continuously welded on both sides, while those thereafter are tack-welded on one side. The process permitted an estimated saving of from 25 to 40 per cent in time and 10 per cent in material. The expense of welding amounted to $1,500, $890 of which went for electrodes. In normal times this item would be less by about 60 per cent. Another experimental barge, with certain parts riveted and others welded, is to be built.

## SCOOP TEARS UP AND LOADS CAR-TRACK PAVING

An immense amount of labor has been saved in removing asphalt paving from between the rails of certain car tracks in San Francisco by mounting a sort of scoop in an inclined position in front of a work car and using that means to tear up the paving and load it. The forward end of the scoop is supported on two small wheels and extends almost down to the paving, while the rear end rests on the end of the car. The work is started by prying up a section of the asphalt so that the nose of the scoop can be inserted under it. Then the scoop and car are moved forward at a slow pace and the asphalt is forced up the incline into the car. Under the supervision of a few workmen a car can be loaded with strips of paving in about 45 minutes. The scheme practically does away with the use of shovels and picks.

Work Car on Electric Line, Equipped with a Scoop-like Attachment for Removing Asphalt Paving between the Tracks

## EXHIBIT AT NATIONAL MUSEUM TELLS STORY OF WAR

The most complete collection of relics relating to the great war to be seen in this country is being installed in the National Museum in Washington. Together with priceless material having to do with previous wars in which this country shared, it will form a wonderful record of America's achievement. The new collection vividly illustrates the military and naval activities of all countries in the war—the allies and the enemy, as well as the United States. Specimens of every conceivable sort, including food, equipment, arms, tanks, aeroplanes, mines, and so on, are being put on display. A complete collection of commemorative medals and military and naval decorations is an interesting feature. One of the especially revered objects is an American flag fashioned by five faithful women in Islay, Scotland, for use at the funeral of the American soldiers lost with the transport "Tuscania."

How the Self-Loading Outfit Operates: As the Car Moves Forward the Paving is Forced to the Top of the Incline, Where It is Broken into Sections and Piled by the Workmen. A Load can be Obtained in About 45 Minutes by This Means

BY COURTESY OF ENGINEERING & CEMENT WORLD

**The New Reinforced-Concrete Arch Railway Bridge across the Schuylkill River at Manayunk, Pennsylvania, before Completion, and the Old Structure That It Replaces**

## CONCRETE RAILROAD BRIDGE BUILT ON REVERSE CURVE

Although reinforced-concrete arch railway bridges have ceased to be uncommon, it is rare that one is built on a curve. More than ordinary interest therefore is to be found in a heavy structure recently completed at Manayunk, Pa., by the Pennsylvania lines. It is a double-track concrete arch bridge that spans the Schuylkill River on a reverse curve. The bridge is 1,800 ft. long. It consists of 15 spans and represents an investment of about $700,000. The opposite ends of the structure are built on six-degree spiraled curves, between which three arch spans carry a 463-ft. tangent. The longest of the spans are three that cross the river proper. Each of these has a reach of 150 ft. and rises to a height of 50 feet.

¶By simplifying the system of tickets given to the passengers on busses in London, a saving of 100 tons of paper pulp was effected in the course of a year.

## REMAINS OF BURNED MARKET MADE INTO AUTO STATION

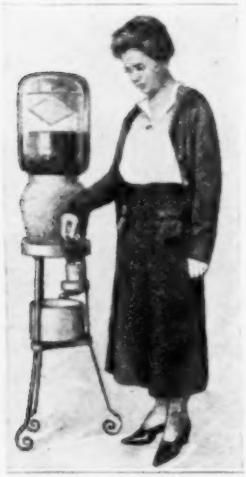
The concrete floor and piers for several stalls, which were all that remained when a market in a western city was destroyed by fire some time since, have been utilized for a particularly efficient service station for automobilists. On the long, narrow concrete foundations which project above

**Service Station for Motorists on the Site of a Market Which Burned: The Piers of the Stalls have been Utilized as Foundations for Oil and Gasoline Pumps and for Air Pipes**

the floor like isles of safety in a street, oil and gasoline pumps and air tubes have been installed. All told, there are six stalls at which as many cars can receive service simultaneously, so that there is practically no delay for customers.

## SELF-COOLING WATER HOLDER MADE LIKE MEXICAN JARS

In several San Francisco offices clay jars, patterned after the clay water containers commonly used in Mexico, are being employed in drinking-water stands in place of ice-cooled coils. The water is delivered into the clay holder from an inverted 6-gal. bottle set in the top. The clay is somewhat porous and the evaporation that takes place keeps the water within quite cool.



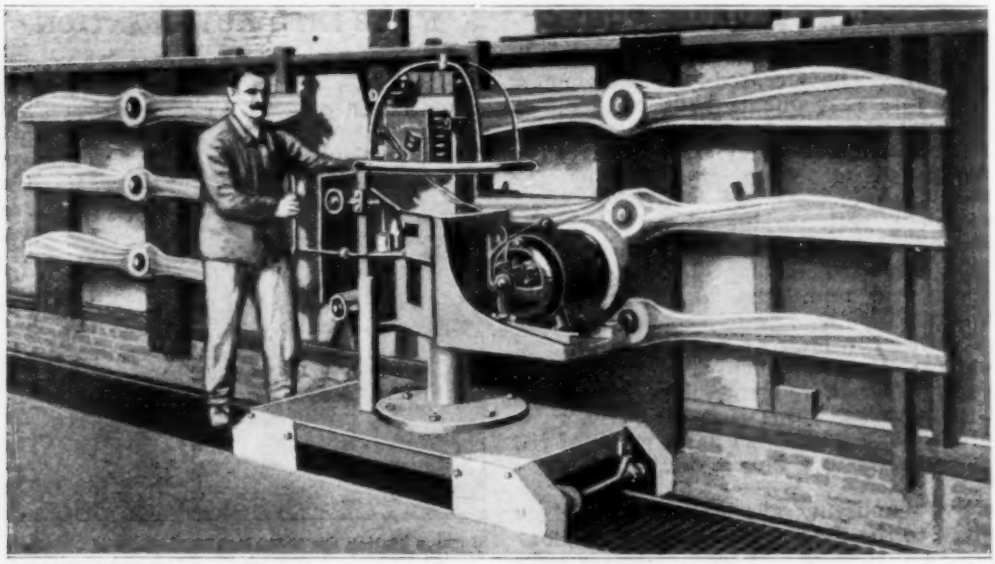
¶Spain is now building the largest concrete ships in the world. One vessel of 6,000 tons was launched a short time ago at Barcelona.

## AMERICANS USE THREE MILES OF FRENCH WATER FRONT

It is estimated that the material of all sorts handled for our soldiers in France, including military supplies, food, clothing, guns, and all other army requirements, amounts to 50 lb. per day per man. For an army of 2,000,000 men this means handling 50,000 tons of goods daily. It is said that some three miles of French water front and 45 docks in five main ports have been occupied by United States forces for the purpose of handling this vast amount of freight.

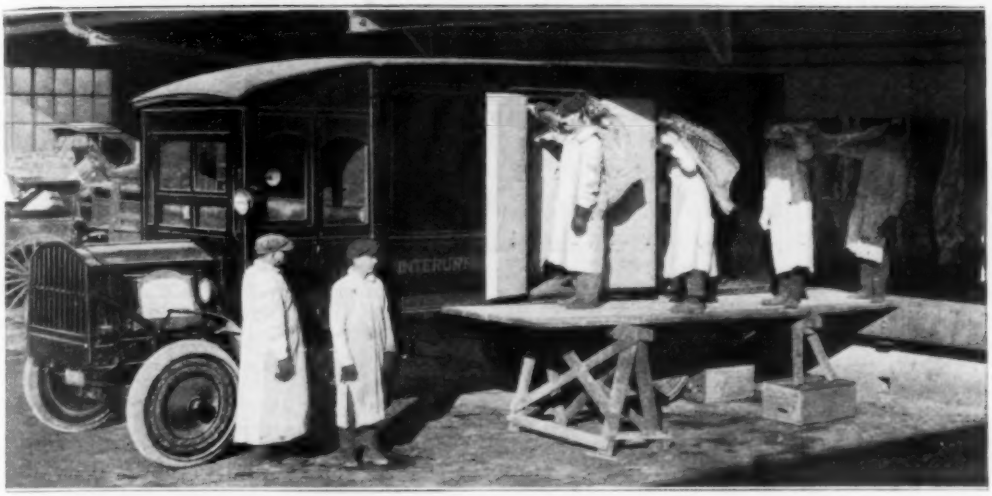
## AUTOMATIC CARVING MACHINE SHAPES AERIAL PROPELLERS

Probably no one machine has done more to aid the production of aeroplane propellers than an automatic apparatus, electrically driven and manually controlled, that carves from three to six laminated blocks at one time. The contrivance is somewhat similar to certain manifold sculpture-reproducing machines, and is moved along a track in front of the embryo propellers, which are arranged vertically in tiers. After the blocks, which are built up of carefully balanced one-inch, straight-grained, kiln-dried selected wood, are carved to about one-fourth inch of their finished size and shape, they are placed in a conditioning room for a fortnight before being worked down and finished.



BY COURTESY OF LA NATURE

**Showing One of the Electrically Driven Automatic Carving Machines Shaping Three Aerial Propellers at a Single Operation**



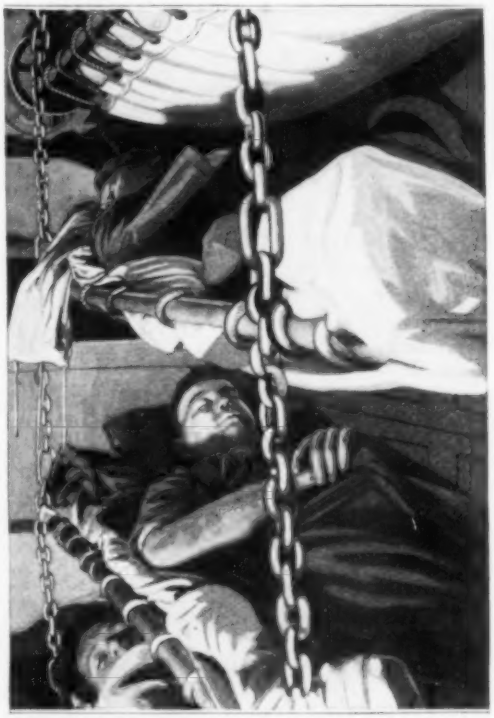
Loading One of the Big Refrigerator Motor Trucks with Meat for Transportation to Toledo from Detroit: On the Road the Heavy Machine Pulls a Trailer

## REFRIGERATOR MOTOR TRUCKS IN INTERSTATE SERVICE

Some time ago mention was made that one of the large Chicago packing companies was successfully employing refrigerator motor-car trailers for distributing fresh meats between its local plants and branch houses. It is interesting therefore to note that the idea has been adopted and expanded by a Detroit company. It requires two and a half days to ship a carload of fresh meat from Detroit to Toledo by rail. The trip is now being made in six hours by refrigerator trucks with trailers attached. The cargo carried by one of these combination units is surprisingly large, 18,000 lb. of meat constituting a load. The service has been placed on a paying basis by accepting express on the return trips.

## SLEEPING QUARTERS ABOARD SUBMARINE CRAMPED

It may well be reasoned that few American travelers, averse to sleeping in upper berths, enlisted for submarine service during the war. Space aboard an undersea vessel is limited, and not the less so in the sleeping quarters. Therefore an overwhelming majority of the bunks are "upper berths" that are reached only by the exercise of some gymnastic skill. They are placed one above the other in tiers and are held by heavy chains at head and foot. It follows, nevertheless, that men who have been in the service a short time learn to sleep as unbrokenly as playexhausted children, despite the dampness of the atmosphere, the elevation of their bunks, and the depth to which their boat may be submerged.



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This Picture of Restful Repose would Not Lead One to Believe the Sleeping Quarters aboard a Submarine to Be Unpopular. The Photograph was Taken When the Vessel was Submerged 100 Feet

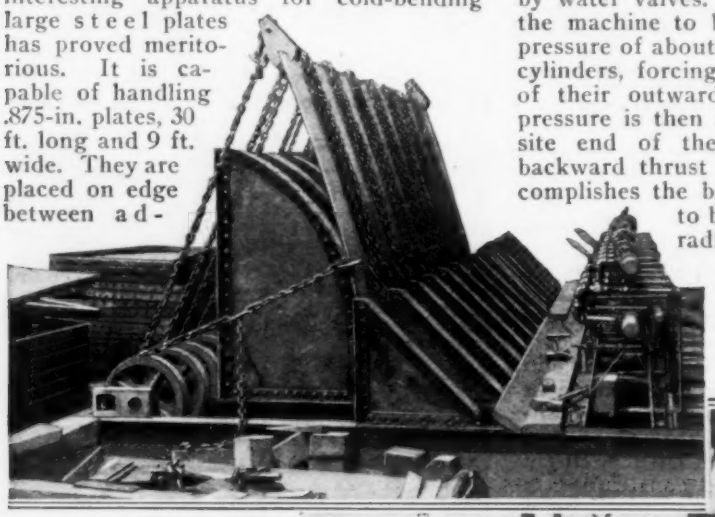
## HOW IMPURITIES IN BRINE AFFECT SALTED FISH

An investigator for the Bureau of Fisheries, who has been giving special study to the salting of fish, finds a number of interesting conditions resulting from the use of impure salt. Calcium chloride, magnesium chloride, and sodium sulphate are impurities commonly found in salt, which cause the latter, when made into brine, to penetrate the flesh more slowly than if pure salt is used. Consequently, in hot weather, fish may partly spoil through the use of impure brine. The investigator points out that where pure salt is used the fish is soft, with brownish or grayish meat. Magnesium chloride keeps the skin bright, and a small amount of calcium chloride makes the fish hard. Both the latter and magnesium chloride give the flesh a white appearance.

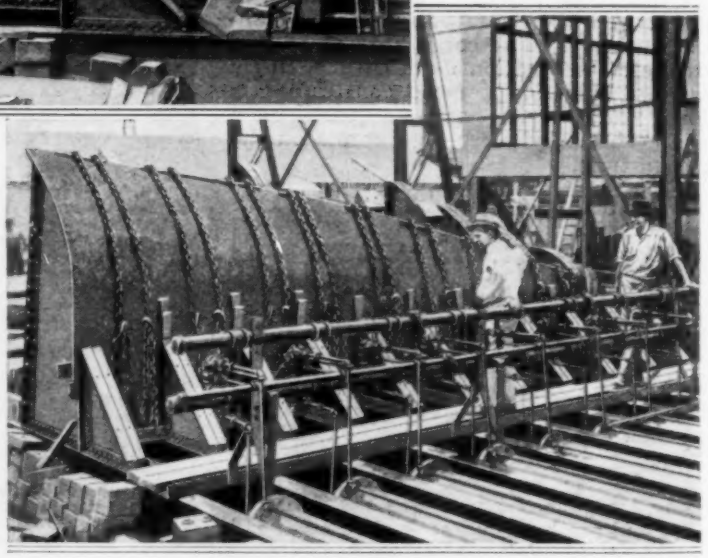
¶In the third quarter of 1918 the construction of merchant vessels in allied and neutral countries, exclusive of Great Britain, reached 972,735 tons. Adding the British output of 411,395 tons, the world's output during the period exceeded all losses by nearly 500,000 gross tons.

## PNEUMATIC APPARATUS BENDS SHIP PLATES COLD

At one of the southern shipyards an interesting apparatus for cold-bending large steel plates has proved meritorious. It is capable of handling .875-in. plates, 30 ft. long and 9 ft. wide. They are placed on edge between adjustable formers and triangular brackets that hold them securely in position. Chains attached to the structural frame are passed over the top of the plate, around sheaves mounted at the base in the rear, and about others attached to the pistons of horizontal pneumatic cylinders. The latter extend beneath the structural framework and are accurately controlled by water valves. When all is ready for the machine to be operated, water at a pressure of about 35 lb. is admitted to the cylinders, forcing the pistons to the end of their outward stroke. Air at 95-lb. pressure is then introduced at the opposite end of the cylinders. It is the backward thrust of the pistons that accomplishes the bending. If it is desired to bend a plate to a uniform radius, a master valve is opened which allows the water to be discharged simultaneously from each cylinder. If one part of the



Side View of the Cold-Bending Apparatus, Showing Chains Attached and All in Readiness for Curving a Large Rectangular Sheet of Steel



The Picture Above Indicates How a Plate is Bent by being Pulled against the Curved Formers. In the Foreground, between the Beams, may be Seen Some of the Horizontal Pneumatic Cylinders That Do the Work

An Unusual Fountain Made Chiefly of Jagged Fragments of Lava, from Which Numberless Streams of Water Pour: At Night, Concealed Electric Lights Illuminate the Scene with Constantly Changing Hues

plate is to be bent more than another, however, individual water valves are opened. This arrangement obviously gives positive control, for water is not elastic and when its discharge from a cylinder is prevented, the piston, regardless of the air pressure behind it, cannot advance.

## APPARATUS FOR DETECTING CURRENT LEAKAGE

An ingenious outfit has been designed for detecting current leakage in the ground near electric lines. It consists of two metal plates of special design, which are strapped to the shoes of the person making the investigation, a battery and controlling switch carried at the waist, and a telephone receiver. When the observer walks about where there are earth currents they are detected by sound in the receiver. If the observer's feet stand parallel with the flow of the current the sound is the clearest, while if he stands with his feet at right angles to the direction of the current, the instrument is silent. This is an aid in finding the source of the current.

¶ The making of bayonets by rolling has recently been proved satisfactory, thereby saving about 70 operations, it is said. The Ordnance Department has placed an order for 300,000 bayonets made in this manner.

## FOUNTAIN OF UNUSUAL BEAUTY MADE OF LAVA FRAGMENTS

A fountain of extraordinary beauty, the sides of which are composed of jagged pieces of lava cemented in place, has recently been completed in a western city. Hundreds of concealed water pipes lead to these rocks, their ends being imbedded in the porous substance so that water flows from the lava in numberless tiny streams that discharge in all directions. With the aid of ferns and palms, the place has been given the appearance of a grotto. At night, hidden electric lights illuminate the fountain with constantly changing hues.

## URGE MOUNTAIN LAUREL AS NATIONAL FLOWER

Efforts are being made by officers of the National Federation of Women's Clubs to secure congressional indorsement of the mountain laurel as the national flower. Those favoring this action point out that the laurel has always been a symbol of victory, that it is evergreen and so can be used for decoration in summer and winter, that it blooms on Memorial Day, Independence Day, and Flag Day, and that it is grown in a majority of the states and can be transplanted. Its clusters of starlike blossoms on one stem are pointed to as emblematic of the union of the states.

# TRAINING TROOPS AT ARMY CAMPS MUSTERED OUT

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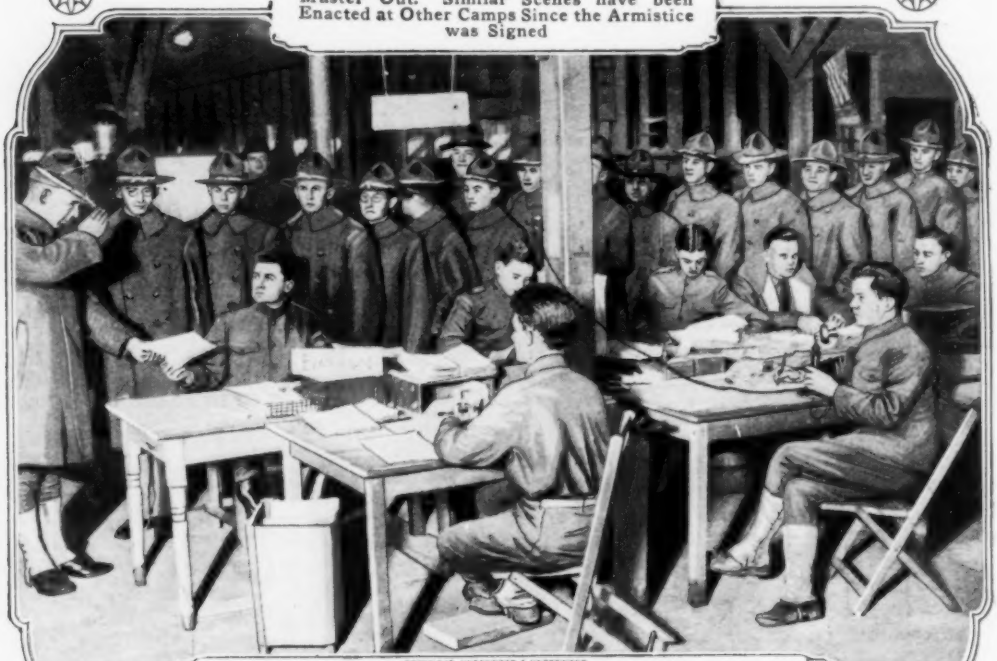
The Photograph Reproduced Above Shows Soldiers at Camp Dix, Wrightstown, New Jersey, Turning in Their Arms Following the Receipt of Orders from Washington to Muster Out. Similar Scenes have been Enacted at Other Camps Since the Armistice was Signed



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Many Students Complained That It Was Just Like the Hun to Cheat Them Out of a European Trip, While Others, Eager to Return to Their Civil Occupations, Were Glad to be Released from the Service. The Picture Shows a Line of Men Receiving Their Discharge Papers

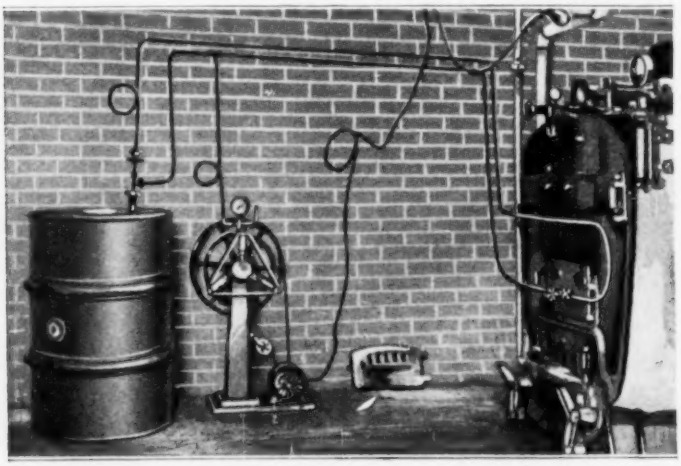
# BELGIAN KING AND QUEEN ENTER BRUGES

When the Hun, Forced to Fall Back to Ghent, Evacuated Bruges, the Joy of the Inhabitants Was Boundless. It Reached Its Climax When King Albert and Queen Elizabeth Subsequently Entered the City. They Are Visible in the Background of the Picture Above

The Royal Party Saluting the Belgian Flag in the Square at Bruges, Which for Four Tragic Years Was in the Crushing Grip of the Teutonic Mailed Fist: The King and Queen Are in the Center of the Picture, and at the Extreme Right Is Admiral Sir Roger Keyes

## OIL-BURNING ATTACHMENT FOR ANY FURNACE

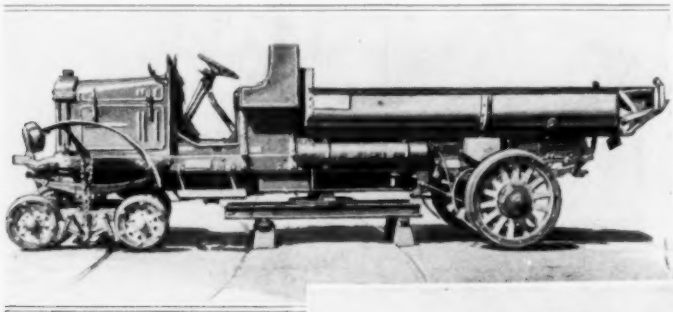
An outfit has been placed on the market with which any type of coal-burning furnace can be changed over to an oil burner with practically no alterations of the existing plant. It is said that the cost of burning kerosene or fuel oil, such as this system uses, is about the same as that of coal. The advantages claimed for it are that all ashes, clinkers, soot, etc., are eliminated, and that the system is instantly responsive to varying temperature needs. The oil burner is attached to a new furnace door which is substituted for the old door, and the oil is discharged from the nozzle under pressure and mingled with air. A motor connected with a light socket drives a triple concentric air pump, which serves not only to draw the oil from the 50-gal. fuel container but also helps to convert it into a spray at the nozzle.



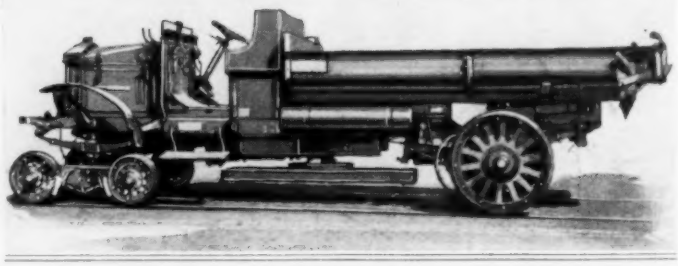
**Outfit with Which a Coal Furnace has been Equipped to Burn Oil: The Liquid Fuel is Forced into the Furnace from the Tank at the Left by Means of the Motor-Driven Pump Set against the Wall. The Only Change Made in the Furnace Is the Substitution of a New Door**

## FIFTH WHEEL UNDER TRUCK SERVES AS TURNTABLE

An automobile truck, equipped to be driven on a mountain-railroad track, is provided with special apparatus for turning it around within its own length, making a turntable unnecessary. This device consists of a fifth wheel, mounted under the center of the truck, to which two pieces of heavy angle iron are attached. The car, when lifted from its wheels by jacks placed beneath these bars, can be swung about until it faces in the opposite direction. Chains are used to prevent too great expansion of the springs when the weight is removed from the wheels. Four small wheels with special brakes are provided at the front. Sand to aid in quick stopping is carried in a cylinder at one side, and is forced out by compressed air.



**Truck Blocked Up and Turned at Right Angles to the Track by Means of the Fifth Wheel: Chains Prevent Expansion of Front Springs**



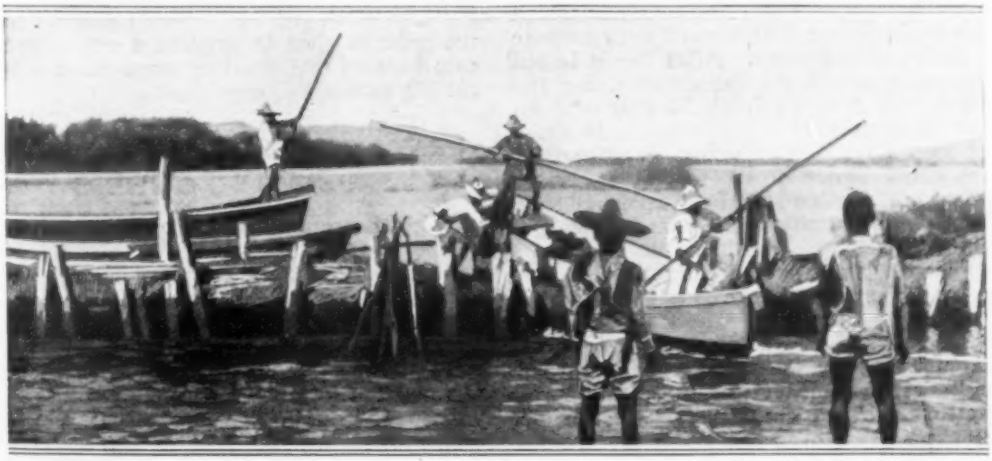
**Automobile Truck Built for Use on a Mountain Railroad: In Order That It may be Turned About without the Use of a Turntable, a Fifth Wheel, beneath Which Jacks can be Set to Raise the Car, has been Installed under the Center**

Indians Employed by Chinese on the West Coast of Mexico, Displaying a Yield of Shrimps: In These Waters the Shrimps Breed in Great Abundance and Commonly Measure from Four to Six Inches Long

## CHINESE CONTROL MEXICO'S BIG DRIED-SHRIMP TRADE

AMONG the little-known but nevertheless exceedingly profitable industries in Mexico is the traffic in dried shrimps, a trade in which successful pioneering was done 15 years ago by a poor Chinaman at a point a few miles south of Mazatlan on the western coast of Mexico. Today this man owns a large fleet of fishing boats, has a working capital of over a third of a million dollars, and does a yearly business of nearly $200,000, about two-thirds of which is from dried shrimps. The market for this product exists chiefly among the Chinese of the Orient and the North American Pacific coast, and among the Mexicans.

Much of the western Mexican coast is marked by lagoons and the mouths of numerous fresh-water streams. It is near the meeting point of the salt and fresh water that the shrimps are caught in great abundance. In fact, the number of shrimps is so great that the Chinese, who still practically monopolize the industry, utilize only a small fraction of the available supply. The process employed by these orientals in catching and preparing the shrimps, they learned in their native land. The breeding place of these creatures is in shallow fresh-water lakes. After breeding they rush down to the salt water, and it is then that they are caught in nets and traps. About eight miles inland from one of the west-coast ports is one of these breeding lakes, near the outlet of which has been built a dam 1,800 ft. long. Along this barrier traps are stationed every 300 ft. These are emptied



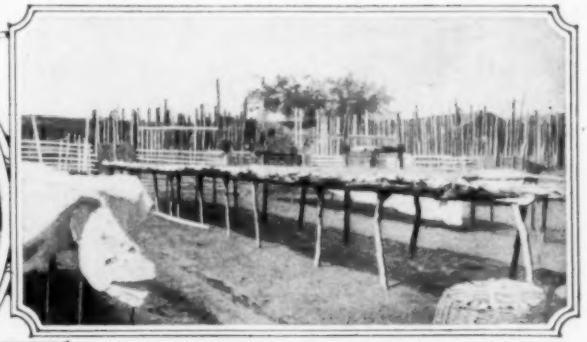
Fishermen on the West Coast of Mexico Starting to Make Their Daily Round of the Shrimp Traps: A Morning's Harvest Often Amounts to Many Tons

Drying Shrimps in Rainy Weather under a Thatched Roof

Beneath the Thatched Roofs Are Crude Oven-Heated Boilers in Which the Shrimps are Cooked before being Dried

by boatmen, many of them hired Indians, and the daily harvest amounts to many tons, sometimes three or four tons per trap.

The shrimps, many of which are 6 in. long, are carried in dugouts to a drying wharf, where they are cooked in water and then dried. The cooking apparatus consists of large brick ovens, arranged in a row under a thatched roof, and on each oven is set a sort of brick boiler in which the shrimps are boiled until they assume a dark reddish color. After being boiled they are spread on the ground, for the most part with their shells still on. In fair weather they dry in the sun in three or four days, but in rainy weather they are dried under cover. Long sticks or rakes are used to stir them up from time to time. Naturally, little regard for cleanliness is shown. In the same waters in which the shrimps are caught there is a great variety of fish, the catching of which is largely conducted by the Chinese living on the coast. Shark fishing is carried on extensively, as shark fins are regarded as a great delicacy by these orientals. Neither the fish industry nor the shrimp industry has been seriously interfered with by the successive revolutionary disturbances in Mexico.



Drying Yard of Chinese Fishermen near Mazatlan, on the Western Mexican Coast, Opposite the Southern End of Lower California

## YANKEE AIRMAN LOOKS DOWN BLAZING CANNON BARREL

In flying close to the ground within the American lines on returning from a scouting expedition over enemy positions in the Meuse-Argonne sector shortly before the conclusion of hostilities, a Yankee aeroplane was violently rocked by a blast from a concealed artillery battery a few yards below. The pilot's experience was most unusual, not to say harrowing. Seeking a headquarters post where he might drop a message, the airman inadvertently drove over the yawning muzzle of a cannon at the instant it belched flame and projectile. Not only did the shell miss the aeroplane by a hairbreadth, but the terrific force of the expanding gases tossed the aeroplane about like a floating piece of paper. The machine passed through the curling smoke ring out of control and the pilot tasted the hot fumes of burned powder. Luckily, however, he regained control of the craft in time to prevent a crash, and came out of the situation none the worse for his unenviable experience.

## CRAFT USED IN COAST PATROL RETURNED TO OWNERS

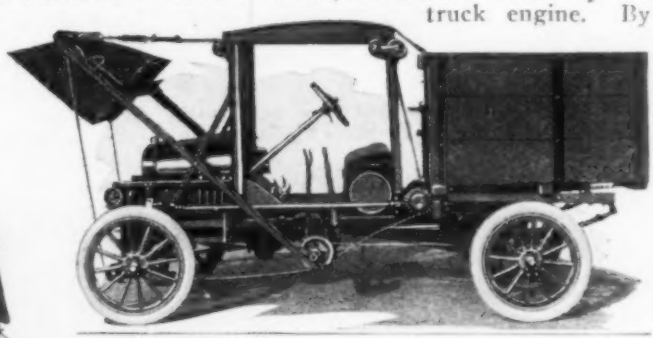
With the coming of peace the secretary of the navy ordered that yachts and motorboats which were operated by private individuals before the war and served as a part of the submarine patrol, be returned to their owners. Many of these were luxuriously appointed craft which were rented to the government for $1 per year. The order specifies that boats which have been injured in war service shall be put in good repair or compensation paid the owners.

TRACTOR PULLS LOG TRAIN ON BOULEVARD OF SNOW

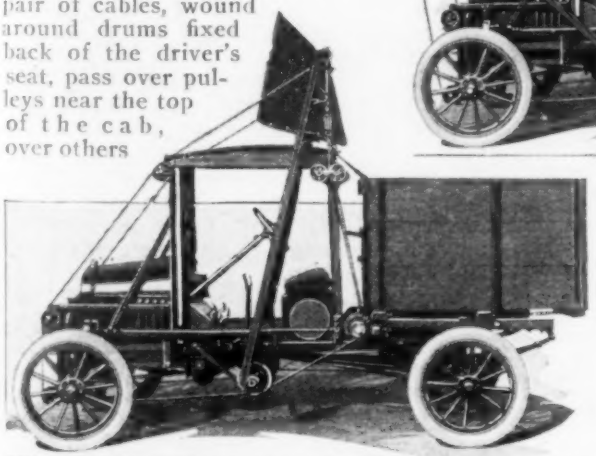
EXTENDING through Aroostook County in the Maine woods, there is a broad roadway, 45 miles in length, over which log trains on runners are pulled by tractors as long as the winter snows remain on the ground. This magnificent frozen avenue of white is 160 ft. in width and passes through forest land of perpetual green in one of America's most picturesque regions. The photograph reproduced herewith well portrays the solemn majesty of the woods and gives an interesting glimpse of one of the tractor-drawn trains.

## DETACHABLE POWER SHOVEL FOR ANY AUTO TRUCK

A power shovel which can be attached to any motor truck is a new invention that greatly lessens the labor of loading bulk materials. The shovel proper is mounted on two steel arms which can be pivotally attached to either side of the chassis frame. A pair of cables, wound around drums fixed back of the driver's seat, pass over pulleys near the top of the cab, over others at the front of the car, and thence back to the drums, which are driven by the truck engine. By this means the loaded shovel is lifted from the ground and swung up over the cab, in which position it discharges into the body.



Auto Truck with a Detachable Shovel Operated by the Automobile Engine

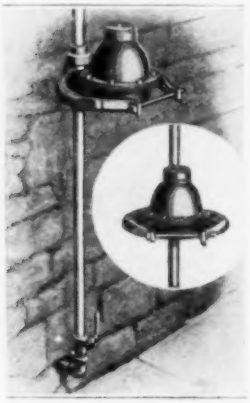


The Shovel is Raised and Lowered by Two Steel Cables Which Pass around Drums Located behind the Driver's Seat

¶Hereafter, interchangeable gloves are to be supplied to our troops instead of right and left gloves, each article being knitted so that the front and back are identical.

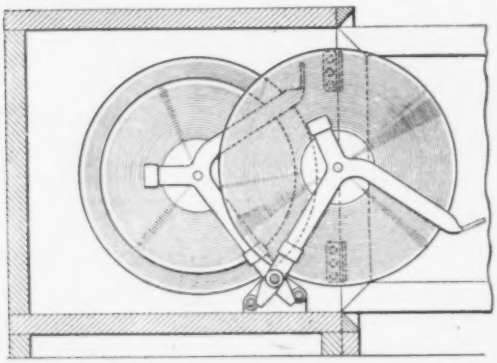
## NEW METER-HOLDING FRAME FOR USE IN BASEMENTS

The advantages claimed for a yoke to hold water meters, installed in basements on vertical pipes, are that it is easy to put in place and it relieves the meter frame of strain. It consists of two hollow curved arms through which the water flows to and from the meter, which is held between them by connecting joints. One arm is also connected to the lower section of the vertical pipe while the other one, through which the water passes after it has been measured, is connected to the upper section of the pipe.



## PHONOGRAPH-RECORD CABINET HAS HANDY NEW FEATURE

A phonograph-record filing cabinet of new design is equipped with elbow-shaped holders which support the disks side by side in small space. Projecting from the side of each of these members is a pin on which a disk can be hung. The lower arm of each is pivoted near the bottom of the cabinet, while the other arm projects in front and bears an index number or name. A slight pull on the holder causes it to swing outward on its pivot, bringing the disk into a position where it can be easily removed.



**Cross Section of New Phonograph-Record Cabinet, Showing Two of the Elbow-Shaped Holders, One in Its Normal Position, and the Other Swung Forward So That the Disk can be Easily Removed**

## UNDEFEATED FRENCH BOY ENDS WAR ACE OF ALL ACES

To Lieutenant René Fonck, of the French aviation service, have fallen the palms of supreme victory in the air. This much-decorated young officer—he is barely 21 and wears the Croix de Guerre with 19 palms, the Médaille Militaire, the Order of the Belgian Crown, the Order of Leopold, the British Distinguished Service Medal, and is an officer of the Legion of Honor—ended the war with 75 official and 40 unofficial victories to his credit. This remarkable record, made even more remarkable by the fact that he survived four years of intense warfare without receiving so much as a scratch, wins for him the title of Ace of All Aces, allied and enemy.

If one-half of the stories told about Lieutenant Fonck are true, he is without question one of the most romantic figures in the history of the world's warriors. Military aeronautics at least has brought forth no personality more interesting or remarkable than this killer of flying Huns.

Fonck at 16 was a pupil of the famous Pégoud. He entered the service at the outset of the war as an observer. In 1916 he became a fighting pilot. When the illustrious Guynemer fell during an encounter with the Hun Wisseman, it was Fonck who climbed aloft and avenged his death.

No airman comes to mind with whom Lieutenant Fonck can properly be compared. He won his laurels by cool, deliberate, methodical fighting. A master with the "joy stick," a dead shot with the machine gun, a veritable Foch in strategy, and a second Hawkeye in fearlessness, he battled with such unemotional finesse and system that he never once suffered defeat. He was not the reckless daredevil that Guynemer was, nor a brilliant performer like the late Lufbery, but a fellow who made little display, judged his cards well, and never bluffed.

Lieutenant Fonck's tactics netted him six Hun planes in one illustrious day's work at an expense of only 56 bullets. In his fastest fight, on another occasion, he downed three enemy planes in 20 seconds.

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¶Announcement was made recently of the formation of the North China Motor Club with headquarters at Tientsin.